The Builder.

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Engineering Construction.

IT is a curious as well as a melancholy fact, that the authors of nearly every book on the theory of engineering construction commence their preface by saying "In undertaking this work my principal object has been to supply the want, long and universally felt among students of engineering and architecture, of a concise text-book on structures," and then proceed to write, chapter after chapter, on the strength of materials and such matters, as if they were the first to really bring these subjects to the notice of those about to enter one or other of these professions.

The "principal object" of the student is to choose the best, from the large number of books already written on the same subject, and the idea that he ever possessed "a long-felt want," for any more literature of this character, which only goes over the old ground again, is entirely erroneous.

If authors, therefore, before commencing to compile a treatise upon any engineering subject, would but ask themselves whether they are able to add anything that is new to the information that has already been published on that subject, the number of new books would be very much reduced, and at the same time their value would be greatly increased.

The literature we already possess on the theory relating to engineering structures is so exhaustive that to write a comprehensive work on the subject necessitates the restatement of those principles, already so ably explained by such well-known authors as Rankine, Stoney, and a host of others, who give in their books formulæ for determining the strength of girders loaded in every conceivable manner, and also for ascertaining their deflection under all possible conditions. The information regarding the strength of columns is practically the same in all these books, and yet it is given over and over again in every new work on constructional ironwork. We are first introduced to short columns, then to long columns, round columns and square columns, columns with fixed ends and with their ends free, until the attentive reader knows the family history of the whole species, even to the minutest detail. In most books Euler's formulæ are next given, these affording an opportunity for introducing a page or two of differential and integral calculus, and even a differential equation. We have no sooner made our escape from the chapter on columns than we are brought face to face with the chapter on the theory of the continuous girder. This portion of the subject must always be looked forward to by mathematical authors, as here again the use of the calculus is most essential. After a few preliminary remarks we are again re-introduced to our very old and respected friend—

$$-EI\frac{d^2y}{dx^2}=M$$

the ultimate result of the close relationship expressed in the equation, being, of course, the theorem of three moments.

Now we were always of opinion that, notwithstanding the quantity of engineering literature, yet a book might still be written which would connect more closely the theory of the subject with every-day practice. We have seen students, after passing through one of the best engineering courses obtainable at any college in this country, during which they were thoroughly grounded in theory, unable, on entering an engineer's office, to make a drawing of a simple plate-girder that could be sent to the works to be constructed.

In nine cases out of ten, students on leaving an engineering college have no idea how the theoretical knowledge they have acquired is applied in practice. What they require to be taught on entering the profession is not how to obtain the stresses on the various parts of a structure, under every imaginable conditions of loading, but what to do with them when they have obtained them. When the necessary calculations have all been made, how are they to be translated into a working drawing of the structure that the contractor can work from? Such comparatively simple knowledge could, of course, be easily taught at any technical college, but it rarely is, because, as a general rule, the Professors are not practical men. The consequence of this system of education is, that after a student has gone through a long college course, and naturally thinks his knowledge has a certain market value, he finds after all it is necessary for him to enter an engineer's office, as a pupil, to learn his profession.

Now Professor W. H. Warren, the author of the book* which has suggested the title and substance of this article, has evidently appreciated the fact that a good deal may yet be written on the connecting links between theory and practice. The special feature of his book lies in the various examples, which are really working drawings, that illustrate the design of the most important classes of structures in iron, steel, and timber, all of which have been selected from existing works.

Of course, working drawings of various structures are often to be found in the pages of the technical journals, and in the proceedings of several engineering societies, but such generally appear without the detailed calculations upon which they are designed, and consequently, although valuable to the initiated, are almost useless to the student commencing the study of engineering.

The first of these examples given by Professor Warren is one for a wrought-iron plate girder bridge, of 62 ft. clear span, for carrying a double line of railway. He first states what is required, then proceeds to make his calculations, very much in the same manner as they would be made in an engineer's office, and finally gives the working drawing of the bridge, which is so complete that were it to be cut out of the book and sent to a contractor it could be constructed without any further information being asked for. Before leaving this bridge the author shows how "the quantities are taken out"; in fact, the student is shown the whole operation, step by step, from beginning to end.

The second example shows the method of procedure in designing an American steel truss bridge, with pin connexions, for a single line of railway. The span of this bridge is 220 ft., and here again the working drawing given in the book is excellent. The next example illustrates the construction of a three-span continuous lattice girder road bridge, supported upon iron cylinders. The necessary calculations are, in this case, of a somewhat more complicated nature, but they are all clearly given, and the working drawing of the bridge and its piers leave nothing to be desired.

To illustrate the design of a swing bridge revolving upon a central pier, the author gives four plates, which contain all the details of the structure, including the machinery, and six additional plates are

* "Engineering Construction in Iron, Steel, and Timber." By William Henry Warren. London: Longmans, Green & Co. 1894.

given to illustrate the details of a three-hinged arch bridge, and a stiffened suspension bridge.

Now if this book contained nothing else than what we have already mentioned, it would still be one of the most useful works that a student could possess. As a matter of fact, however, it does contain a large amount of practical information, although, perhaps, too much space has been given to those subjects that are common to all text-books of this character. In considering the strength and elasticity of iron, steel, and timber, the author explains the methods of testing specimens, and describes many of the experiments recently made, which have added so considerably to our knowledge of the physical properties of materials. Hardly sufficient prominence, however, has been given to that portion of the subject which deals with the size and preparation of the specimens of iron and steel which are to be tested. It is to be regretted that, at the present time, there is no generally-adopted form of test-piece used, the consequence being that specimens taken from metal of precisely the same quality may be made to indicate very different results when tested, since, in order to obtain from any sample of metal relatively high percentages of ultimate elongation, it is only necessary to modify the form of the test-piece.

The fact that short or thick test-pieces give a higher percentage of stretching than longer or thinner pieces, is well known, and to secure reliable tests, the length in which the elongation is to be measured, is, usually, although not always, stated. The width and thickness, however, of such specimens are rarely if ever specified, so that, in the hands of a skilful experimenter, the material could be shown to possess almost any degree of elasticity that might be required. In specifications for steel, such as is now used for bridge-work, it is generally stated that the breaking strength of specimens must lie between certain limits, and the elongation of the specimen tested must not be less than a fixed percentage measured in a length of 8 in.

The fatigue of metals, which Professor Unwin defines as the loss of power of yielding in the particles near the plane of weakness at which fracture occurs, is also considered by the author at some length. The experiments of Herr Wöhler demonstrate that rupture may be caused not only by a steady load which exceeds the carrying strength, but also by repeated applications of stresses, none of which are equal to this carrying strength. This is confirmed by the exhaustive series of experiments made by Professor Bauschinger, who has shown that wrought iron which has an ultimate statical strength of about 23 tons per square inch will fail after fifteen million repetitions of a load which only caused it to be stressed from zero to 13 tons per square inch, or the same number of applications of a load causing alternate tensional and compressive stresses of but 7 tons per square inch.

Sir B. Baker, during the construction of the Forth Bridge, made various experiments on the fatigue of metals. He found that when a shaft was loaded with one-half its breaking weight and set rotating, about 5,000 reversals of stress would produce fracture; and he also proved by experiment that the effect of repeated stresses is more prejudicial in tension than in compression.

In practice the fatigue of materials is more noticeable in machinery than in engineering structures, although in some parts of railway bridges its effects cannot be ignored. The Board of Trade rule for such structures is simply to limit the working stresses in iron to 5 tons per square inch in tension and 4 tons in compression; in steel bridges, however, the limiting stress is increased to 6½ tons per square inch. No experienced engineer would always work up to these limits. In some parts of the main girders he would feel justified in taking full advantage of the regulations, and adopting the maximum stress allowed, but in other parts of the bridge, such as the cross-girders and rail-bearers, where the load is suddenly applied, he would not permit the working stress, per square inch, to exceed 50 to 75 per cent. of the above limits.

In America, where the magnitude of the bridges often allows of great refinements being observed, much more attention is paid to these matters than in this country, and very elaborate specifications have been prepared to govern the designs of important structures.

Much information will also be found in the pages of Professor Warren's book on the strength of timber, and the method of using this material for the construction of viaducts, trestles, piles, and for various other purposes. He also gives a *résumé* of all that is at present known regarding wind-pressure, and how its effect must be provided for under various conditions.

In our opinion, the student who will carefully work through the book will find, when he has mastered its contents, that he has an amount of knowledge that will secure for him remunerative employment in an engineer's office; and although this may not be the only object of study, yet at the present day it is one that can seldom be neglected, and we feel, therefore, justified in recommending a book that will lead to such a desirable result.

THE PLANNING OF PUBLIC LIBRARIES.*

By G. WASHINGTON BROWNE, A.R.S.A.

Lending Library.

WE now come to the Lending Library, the arrangements of which present various points of much interest, which are well worthy careful consideration. The nature of the work carried on in this department is nearly identical with that carried on in the telling-room of a bank, the matter changing hands being books instead of money; and I take it that the plan found by experience to be most convenient for the one business will be well adapted for the other. Thus, where a large amount of business is to be transacted, the model would be the telling-room in the head office of a bank; and for smaller business, the corresponding-room in a branch bank. The former was the model adopted for the lending-room in the Edinburgh Library, and the librarian, after two or three years' experience, declares it to be a model lending-room, permitting the highest possible efficiency in service. Contrast with this the meagre, narrow, confined spaces, called "borrowers' lobbies," in many English plans, lobbies in which it seems to me physically impossible to carry on the work. Supposing the total number of daily applicants to borrow, renew, or return books, came in a uniform stream at regular intervals throughout the whole twelve hours during which the library is open, it might work well enough. But (and this is especially the case in industrial communities), the truth is they come in large numbers within the few minutes near the beginning and close of meal hours, and in the evening after tea, when hopeless crowding, with its resultant grumbling and disappointment, is inevitable.

The key to the whole plan of the lending-room is the indicator, that most useful of all appliances in a Public Library, saving the time and temper of the public and the staff alike, and enabling the work to be carried on with a smoothness and a quickness otherwise unattainable.

To the venerable Mr. Kennedy, a retired school-master in Dundee, belongs, I understand, the credit for the original conception of the principle of the indicator, and those invented by him are still in use in the Public Library in Dundee, though they have now become obsolete and generally superseded by the improved patterns brought out by Mr. Elliot and Mr. Cotgreave. Cotgreave's is in use at the Edinburgh Library, and possesses, among its other merits, the advantage of being the most compact. The space within each frame is divided by thin metal plates into 4,000 small pigeon-holes, in each of which is a tablet bearing upon either end a number corresponding with that of a book upon the adjoining shelves. The number is printed in blue upon one end of the tablet, and in red on the other. So long as a book is on the shelf the corresponding number is displayed with the blue end of the tablet towards the public; the moment that book is given out to a borrower the attendant reverses the tablet, turning the red figuring to the public, and as upon the frame of the indicator is printed the words "red is out" the public know not to apply for a book whose number is displayed in that colour. In issuing books no ledgers are required, the only entry being the number of the reader's ticket upon the small record-book incorporated with the tablet bearing the number of the borrowed book. In exchange for a book the borrower gives up his reader's ticket, upon which is written his name and address. This is deposited in the pigeon-hole along with the tablet bearing the number of the borrowed book, and remains there until the book is returned, when it is handed back to the reader. So long, then, as the reader's ticket remains in the hands of the librarian, it serves as a receipt for the book borrowed; while its possession by the reader is his proof that the book has been returned.

The total height of the indicator as used in ordinary practice is 4 ft., the nett space occupied by the figured pigeon-holes being 3 ft. 3¼ in. Its length is 15 in. for every 1,000 books recorded, and it is made in 5-ft. lengths, each length indicating 4,000 volumes. If these are arranged in pairs, which is probably the most serviceable and economical grouping, they occupy a length of counter of, say, 10 ft. 3 in.,—allowing a trifle for some kind of wooden case to enclose the somewhat uncouth iron framework—10 ft. 3 in., for a record of 8,000 volumes. Now, experience shows that this is just about the number of volumes that one, or, where there are a number, *each* attendant can serve from with reasonable speed. So that, for each 8,000 volumes, you require a service space which cannot be less than 18 in. or 20 in., and this space would probably be sufficient between the pairs of indicators if the applicants came at regular intervals all day long. But, as we find they come at certain hours quicker than they can be served, you have three four, or half-a-dozen people waiting their turn at each service opening at certain hours, just as you have at the ticket-office of a railway station a few minutes before the departure of a train. Now, if the indicators were placed close up to each side of the service openings, those persons waiting their turn would be standing in front of the indicator, completely preventing new comers from seeing whether the books they desired were in or out. Consequently, it is necessary to place the pairs of indicators at some distance apart, that they may always stand free for examination, and this distance cannot well be less than 5 ft. Now, 5 ft., *plus* the length of the indicators with their frames, 10 ft. 3 in. = 15 ft. 3 in. lineal of counter for every 8,000 volumes, which is exactly 23 in., or, as nearly as may be, 2 lineal ft. of counter for every 1,000 volumes in the library. This, then, is a most important and valuable factor; and no plan of a lending library can be considered satisfactory which does not provide something very near this proportion of counter space to the number of volumes shelved. As we shall see presently, under favourable conditions this may be reduced to a minimum of 20 in. per 1,000 volumes, but under the ordinary conditions of practice the higher figure will be found necessary. As the counter forms the barrier between the public and the staff, you must provide in front of it a sufficient space for your public coming and going and passing from one indicator to

* Concluded from page 149.

TABLE SHEWING
NUMBER OF SQUARE FEET PER READER IN NEWS ROOM
(NEWSPAPERS AND MAGAZINES)

EDINBURGH	BRECHIN	CHELSEA	SOUTHAMPTON	ABERDEEN	MODEL A	MODEL B
N. 22 / M. 21½ } 21¾	12	20 / 15 } 17½	18 / 23 } 20½	—	—	—
AVERAGE (EXCLUSIVE OF BRECHIN) 20						

LENDING ROOM

TOTAL NUMBER OF VOLUMES ALLOWING 13 LINEAL FEET OF BOOKCASE AVAILABLE BY HAND FROM FLOOR LEVEL TO EVERY 1,000 VOLUMES.						
48 000	8,000	24,000	24,000	40,000 / 32,000	72 000	88,000
NUMBER OF SQUARE FEET OF FLOOR AREA PER 1,000 VOLUMES						
88	77	73 - 78	83	84 / 105	58	48
AVERAGE (EXCLUSIVE OF ABERDEEN AS EXECUTED & MODELS) 81						
LENGTH OF COUNTER IN INCHES PER 1000 VOLUMES						
27	27	21	12 - 17	48 / 49	20	23
AVERAGE. (EXCLUSIVE OF ABERDEEN) 23						

another with perfect freedom; and the absence of this free space is another of the conspicuous defects too frequently found in English plans; indeed the two defects of insufficient length of counter to accommodate the indicators, and inadequate space for the public in front of them, invariably go together, each being an inevitable accompaniment of the other. Behind the counter you must provide space for shelving books equal to 1,000 for every 2 ft. lineal of counter, besides free space for the attendant passing to and from the bookshelves, the service opening, and the indicator. Now you cannot get more than ten volumes in each lineal foot of shelf, taking the average all through, or twenty volumes per shelf in the 2 ft. of corresponding counter length, and, as the shelves average 10 in. from centre to centre in height, it follows that, to hold 1,000 volumes, you require the shelving 500 in., or 41 ft. 8 in. high, if it were ranged singly against the wall behind the counter, 2 ft. lineal of shelving and 2 ft. lineal of counter representing 1,000 volumes of books alike on shelves and in indicators, with their accompanying service openings. As this would be a ludicrous, not to say, impossible, height, the shelving is generally ranged at right-angles to the counter, between it and the wall, as at Edinburgh and Brechin, where there is a liberal allowance of counter space, or ranged in receding rows parallel to the counter, as in Chelsea and Southampton, where the counter-space is more restricted. A glance at these plans will show how much more efficient the service must be by the former than by the latter of these two methods.

The proper spacing of the cases from centre to centre, and the breadth of the shelves themselves, are next to be considered. As octavo is the largest size of volume that prevails in the lending department, a depth of 7½ in. from front to back of shelves may generally be considered sufficient, and, as the cases are usually double, the books being inserted from two faces, we get a total breadth of 15 in. The double shelving has rarely a back or division between the two fronts, as, when open right through, no corners are formed for the lodgment of dirt, the shelves are more easily and effectually dusted, while the free circulation of air is better for the books. The clear passage between two sets of bookcases should not be less than 3 ft. 6 in., which, with the 15 in. required for the shelves, gives a minimum from centre to centre of 4 ft. 9 in. In the original plan of Aberdeen the spacing is a trifle under 4 ft. centre to centre; in the plan adopted the spacing is increased to 4 ft. 6 in. In Chelsea and Brechin it is just a fraction under 5 ft., and in Southampton plan it is shown about 6 ft. 6 in., but would have to be closed up to get the necessary space for the public and counter; and in Edinburgh, where they take their spacing from the architectural bays of the room, they stand 6 ft. 9 in. centre to centre.

The height of the shelving above the floor should never be greater than that which permits the books upon the top shelf to be reached by a person of average height without the aid of steps or ladders, fixed or movable. All such expedients are objectionable, and result in injury to the books, and also to the shelving, and sometimes to the person, and should be avoided. The maximum height of the top shelf above the floor should be 6 ft. 6 in., giving a reach under 7 ft., and enabling the range of shelving, with its cornice, to finish within 8 ft. Within this limit of height you get eight rows of shelves, and, allowing ten volumes to the foot in each row, you require 12 ft. 6 in. clear length of shelving for every 1,000 volumes, or, adding 6 in. for the vertical supports and divisions, 13 ft. lineal of shelving accessible by hand from the floor, and 2 ft. lineal of counter length for every 1,000 volumes in the lending library.

Still adhering to the unit of 1,000 volumes, our next point of enquiry is—what area of floor space in superficial feet is necessary in the lending library to provide accommodation for books and indicators, staff and public, upon the scale just laid down as necessary for efficiency?

I have shown on the accompanying table the proportions of storage room and floor area, &c., in the libraries I have selected as good types,* and I find the floor space per 1,000 volumes wonderfully uniform all through. The figures are:—Edinburgh, 88 superficial feet of floor space per 1,000 volumes; Brechin, 77; Chelsea, 73, or, if corrected, as it ought to be, by squaring up the space for public, 78; Southampton, 83; and Aberdeen, as originally proposed, 84. This is not a wide divergence, the greatest difference, considering Chelsea to be corrected, being 11, and the average of the figures as they stand 81 superficial feet of floor space to every 1,000 volumes. Aberdeen plan, as executed, shows a much less favourable result—viz., 105 superficial feet per 1,000 volumes.

With the view of arriving at the maximum number of volumes it is possible under any circumstances to obtain in a lending library, while providing the requisite length of counter to place the indicators, and sufficient service openings to secure efficiency of service, I have prepared two plans of rooms, each having an area equal to that of the lending-room of the Edinburgh Public Library, viz., 42,000 square feet. I have arranged this area into a quadrilateral apartment of the most suitable proportions for each case. In the one instance, Plan A, I have assumed unrestricted light on all four sides, and have ranged the bookcases at right-angles to the walls, and restricted them in height as before, so that every volume is accessible by hand from the floor level. The space for the public is in the centre, and measures 42 ft. by 23 ft.—a good, free, open space. By this arrangement I obtain bookcase accommodation for 72,000 volumes upon the standard adopted throughout this paper

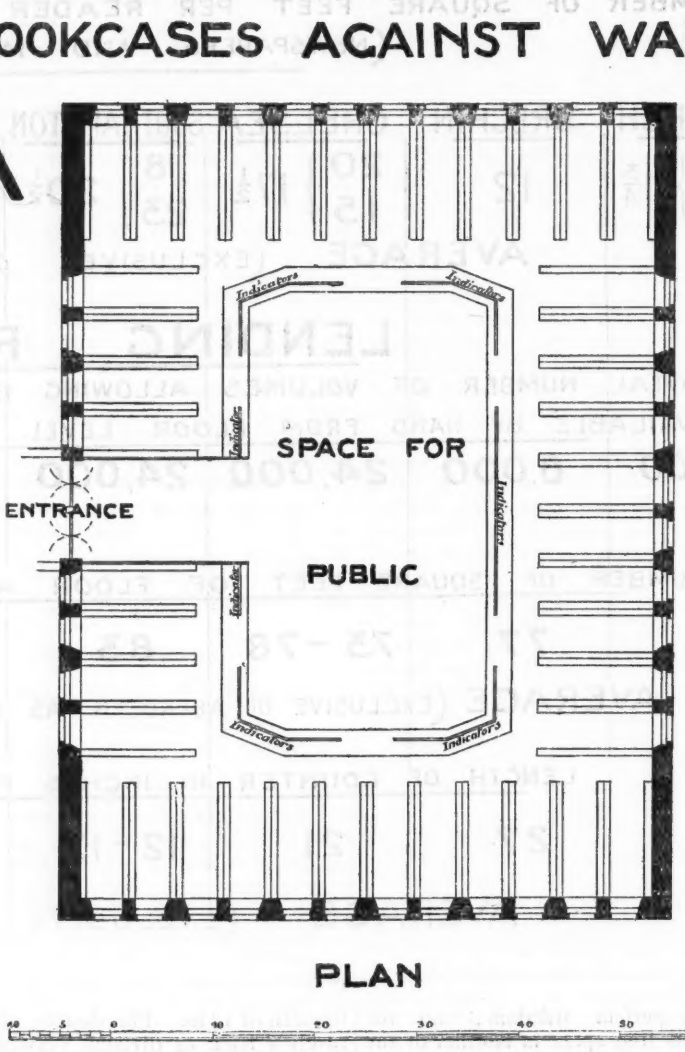
* The upper portion of this table gives the proportion of space in News-rooms, referred to in the portion of the article published last week.—ED.

of ten volumes per lineal foot of clear shelf, and eight rows of shelves in height. I obtain also 120 lineal feet of counter, measured along the line of indicators, giving accommodation for the requisite number of indicators, 18 at 4,000 each, and for six service openings of 5 ft. each; that is to say, one service opening with space for applicants standing clear of indicators to every three indicators. In the conditions already considered, I have taken one service opening for every two indicators, but the nearness of every book to the attendant under this plan would permit of quite satisfactory efficiency with one service opening to three indicators. A comparison of this plan with those of Chelsea and Southampton, will, I think, bear this out, yet both of these have but one service opening to every three indicators, so that a higher standard of efficiency would be obtained than in these two instances, though perhaps not reaching the ideal as at Edinburgh and Brechin. The space between the counter and the ends of the bookcases may appear little enough, but in the plan the counter is drawn 6 in. too broad. This 6 in. would be thrown into the passage, making it 3 ft. wide. The figures brought out by this plan, and shown upon the table previously given, are 58 ft. superficial of floor space, and 20 in. lineal of counter space for every 1,000 volumes.

In plan B I have worked upon the same superficial area of 42,000 ft., and have assumed no light obtainable from any of the sides, but the room entirely top-lighted. Under such conditions I have stacked the books in the centre of the room, three tiers high, under a glass roof (as at the British Museum), encircled the bookcases with the service and indicator counter, and placed the space for the public in the form of a continuous corridor or ambulatory, 10 ft. wide, between the counters and the enclosing walls of the room.

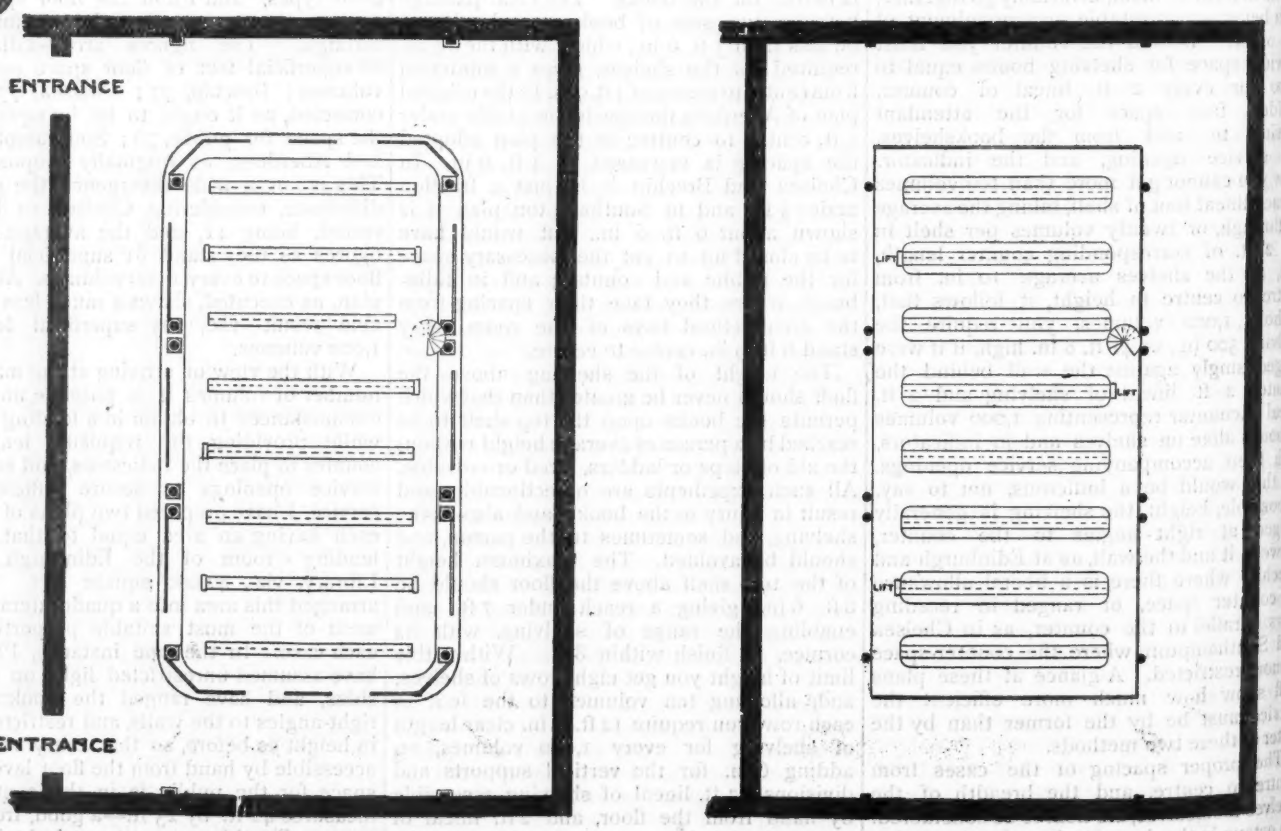
By this arrangement I obtain book-case accommodation for 88,000 volumes, allowing

A LENDING LIBRARY WITH BOOKCASES AGAINST WALLS



PLAN

B LENDING LIBRARY WITH CENTRAL BOOK STACK



PLAN AT ENTRANCE FLOOR LEVEL

PLAN OF UPPER TIER OF BOOK SHELVES

Scale of Feet

10 volumes per lineal foot of shelf as before, and taking advantage of three rows of shelves obtained under the counter all round. For this number of volumes 22 indicators are required, and at least half that number of service openings. The counter space obtained is 168 lineal feet, giving exactly the length required for 11 pairs of indicators at 10 ft. 3 in. each, and 11 service openings of 5 ft. each—one service opening for every two indicators, which, in such a plan, involving slower service on account of the time occupied in getting volumes down from the upper tiers, would be absolutely necessary.

The figures brought out by this plan, and shown upon the table, are 48 feet superficial of floor space, and 23 inches lineal of counter space for every 1,000 volumes.

In both these plans, by which such high results are obtained, I have considered myself wholly untrammelled as to dimensions and shape of ground, mode of access, means of lighting, &c.; indeed, in each case, I have made my own conditions as to surroundings, and, of course, made them the most favourable for my purpose. And while in neither case have I assumed anything either impossible or unreasonable, it would be but rarely that one would find oneself with so free a hand in actual practice. Consequently, the results so obtained are not the results to be expected in practice, but they may be advanced as the theoretical standard, towards which one's aim should be directed in practice, and below which one need only fall by the limitations of unfavourable or modifying conditions.

Another point of interest in connexion with lending libraries, though it may be said to belong rather to administration than to planning, is the classification of books under their general subjects. The usual classification is a vertical one, giving in one bay or division, say, Theology, in the next, say Science, then Art, and so on through History, Biography, Travel, Fiction, &c. You can see that such an arrangement in a public lending library would throw an immense strain upon those members of the staff who had the section of fiction, while those having law and theology might go to sleep half the day. This may be alleviated by increasing the number of attendants at the over-taxed service openings, but the attendants then get into each other's way. The true solution, and that which distributes the work equally among the staff and gives the most efficient service to the public, is the classification adopted by Mr. Morrison, the chief librarian at the Edinburgh Public Library, and originated, I understand, by him, viz., horizontal classification.

Here the several subjects, as Philosophy and Theology, Science and Art, History, Travel, and Biography, Fiction, and General Literature, occupy one or more shelves as their numbers require right round the library from one end of the bookcases to the other, and thus each attendant has a fair share of the work belonging to each section of literature.

I have dwelt at great length upon the lending library, because I feel it is the department that presents the most interesting problem in the planning of a public library, and is a department which is capable, with all its complexity, of being reduced to a few fixed rules, which I have endeavoured to establish, of floor space, counter space, and shelf space. These once established and recognised, their distribution and application to the varying conditions of site and amount of accommodation required are matters of detail, which the ordinarily skilful architect will successfully apply to each case he is called upon to deal with.

Reference Library.—The conditions surrounding the reference library are so varied, ranging from what is apparently a single book-case in Brechin up to a maximum whose limit is set only by the sum of the world's literature, that I do not propose to attempt the task of reducing its requirements to fixed standards, as I have done with the news-room and lending-room. The first important question that confronts us, in considering the reference library, is that of the housing of the books. Shall they be housed in the reference-room or in a separate book store? The old time-honoured method is to have them in the reference-room, the newer method is to stack them in a store behind. The latter is probably the more scientific method; but, as in the matter of house-warming, one's sentiments cling to the old unscientific open fire, so also one's sentiments cling to seeing the books upon the shelves in the room, public or private, which we call a library. There is certainly an educative influence, combined with an incentive to further reading, excited by the presence of the volumes around one which would be lacking were they absent from the walls, and to stimulate the desire for further knowledge is not the least among the missions of the Public Library. There is the wall space ready to hand for storing books, and I know of no good reason why it should not be utilised for this purpose. I think, probably, a combination of both methods is good, and in process of time both will become necessary. Public reference libraries, as we are considering them, are yet in their infancy, and who shall say to what proportions they may not grow. Once the reasonably available wall or other space within the reference-room is occupied, and a receptacle to receive the overflow becomes necessary, it is expedient that the receptacle be a properly constructed and lighted book-store, and not a dark, dingy, and inaccessible cellar or attic. This has been done in the British Museum Library. The great rotunda, used as the reading-room, is lined with book-shelves right up to the springing of the dome, and beyond the circular walls are the great stores, constructed as I have already explained. So, in Edinburgh, the solid walls in the arms of the cross, and the spaces between pillar and pier, are set off in book-cases, three tiers high, with access galleries reached by the enclosed circular stairs in the angle piers; but the plans provide for a book-store, constructed as at the British Museum, to be erected as an extension whenever the necessity may arise. At Chelsea, the original plan of having book-cases in two tiers with a gallery round the walls of the reference-room, was abandoned, and the books were stacked at once in the store behind.

In whichever place the books are kept, a standard different from that of the lending library must be adopted in calculating the shelving necessary to accommodate a given number of volumes. The publications found in a reference library range in size from the bijou 32 mo. to the stateliest folio, and in thickness from the lean and slender pamphlet to the corpulence of the omnivorous encyclopædia. Upon an average, one cannot count upon more than seven and a-half volumes per lineal foot of shelf, while the height will average one shelf to the foot—that is to say, that while in the lending library you may reckon upon twelve volumes per superficial foot of shelving frontage, in the reference library you cannot reckon upon more than seven and a-half, or, at the outside, eight volumes in the same space. In other words, within a given superficial frontage of book-case, the number of volumes pertaining to a reference library that could be shelved would be, to the number pertaining to a lending library that could be shelved within the same frontage, as two to three.

The tables in the reference library should be single, not double, so that the readers sit at one side only, and all face the librarian's desk. This affords opportunity for better surveillance, and checks the depredations of the book-ghoul. An allowance of not less than 2 ft. 6 in. should be made for each reader at a table. This is the allowance given in some of the best English libraries as Leeds and Birmingham, and was adopted at Edinburgh. The British Museum reader has the princely allowance of 4 ft. 2 in. The single tables are 2 ft broad, and should be spaced 3 ft. apart. Short tables are preferable to long ones, and special tables, somewhat broaded than the single ones, should be set apart for the use of accredited students reading up a special subject for which they may require several volumes at a time for cross reference. The alcove principle for planning a reference library, besides offering the amplest opportunities for shelving within the room, affords also excellent bays for the accommodation of the special student beyond the central floor space occupied by the general readers.

There are other points of considerable importance in their relation to the "life" of books, readers, and staff, which call for careful consideration in the planning of Public Libraries — such as lighting, heating, and ventilation—which I cannot close this paper without a passing reference to, though I shall confine myself to a single sentence upon each.

On the general question of lighting, natural and artificial, one would say, carry out the injunction contained in the quotation Mr. Carnegie inscribes over the doorway of every Public Library he builds—"Let there be light." In natural lighting a top-light, where obtainable, has many advantages. It is the nearest approach to external lighting that can be obtained within a building. It is admitted to be the best light for seeing paintings in, and it cannot be a bad one for seeing books in. For artificial lighting, the electric light should be adopted wherever obtainable, for reasons which it is hardly necessary to discuss.

Regarding heating and ventilation, one might paraphrase the old proverb and say, "Take care of the ventilation and the heating will take care of itself." I have been in many libraries that were over-heated and lacked ventilation, but I never was in one that was over-ventilated and lacked heating.

NOTES.

THE Scotch coal strike is not yet at an end, although, as the result of the ballot to which we referred last week, the men have declared themselves in favour of a compromise. The majority was only 4,475 on a total poll of 46,359, and it must be remembered that the vote was not upon an offer of the masters, but upon a suggestion from an outside body. Still, the fact remains that a majority of those voting have registered their willingness to forego half their original demand, and this should certainly facilitate a settlement. There is a "rider" to the resolution which the Scotch coalowners doubtless object to, viz.—that if the sixpence advance be given, it shall be guaranteed for two years. The masters do not seem much inclined at present to grant the 6d., or to make any concession at all, and they are therefore hardly likely to consent to bind themselves in the manner suggested. The men, generally, are determined not to resume work on the old terms, or to permit those who would; and bad feeling is being engendered, which is causing much uneasiness and apprehension. At some of the pits where the men are willing to work, they are confronted by the "peaceful picket" with the usual methods of persuasion, and some rather serious encounters have taken place this week.

IT will be anything but reassuring to nervous passengers to read Major Marindin's report of the recent buffer-stop smash at St. Pancras. The report amply confirms the opinions expressed in these columns regarding the cause of the accident, and cannot but tend to somewhat shake public confidence in this generally well-managed line. The driver trusted to the continuous brake-power to pull up before reaching the buffer-stops, although forbidden by the rules of the company to enter a terminus at a speed higher

than a hand-brake stopping speed. Moreover, that this is systematically done is, says the report, "a notorious fact." Here is a rule involving the safety of passengers observed, apparently, in a precisely similar manner to that relating to tips. It seriously weakens the value of the whole book of rules, as safeguarding the travelling public, if one of such importance can be 'notoriously" disregarded with impunity. It is well for the company that they escaped as they did, although they will quite likely find that they have lost some of their competitive passenger traffic, in addition to the money out-of-pocket for compensation.

THERE seem to have been an unfortunate number of hotel fires at summer resorts of late. Two reports reached us from Switzerland alone last week—one from St. Moritz, and the other from Beatenberg. To anyone who has watched some of the Swiss Hotels being constructed, and has noticed the dearth or inefficiency of the extinguishing apparatus in this class of building, the disasters must seem wonderfully few. It would be in the interests of the Swiss if their Government were to enforce some preventive regulations, as a list of casualties would probably at least temporarily prevent many from sleeping in these dangerous match-boxes. Since the introduction of lifts even staircase accommodation is getting scarce in the Swiss hotels, and a night panic would be most disastrous. In these buildings the least that could be done would be to supply rope-ladders and shoots for life-saving purposes. Safe hotel plans require no room to be farther from a staircase than 60 ft., and they must be so planned that in case of one exit being blocked a second can be found. As to extinguishing gear, buckets and small hand-pumps generally do the best service in risks of this kind. So-called "grenades" and "extinguishers" are unreliable.

SOME two years back two enterprising architects at Stuttgart commenced issuing regular illustrated reports on the leading architectural competitions held in Germany. The complete sets of drawings of the successful competitors were published, and a selection made from the sheets of the less fortunate contributors. A plan of the site, the competition regulations, and the assessor's remarks were added, and the whole formed an invaluable record, especially for those who wished to benefit from their competition efforts, but had no opportunity of seeing the work exhibited in the usual way. Now the same architects have commenced publishing a Competition Gazette in connexion with their illustrated journal. All competition news, rumours, correspondence, &c., will be found room for in its pages, and there will be criticisms on the competition work from well-known pens, besides the report of the assessors. The unwary will be warned of the ways of the questionable competition promoter, and the tricky "programme" will be carefully analysed for the benefit of rash, would-be competitors. As this enterprise is in good hands it will, no doubt, be exceedingly useful and the standard of competitions will be raised. There is quite scope enough for a Gazette of this kind in Germany, where the number of competitions is always very great.

THE final report of Mr. Little, the senior Assistant Commissioner of the Labour Commission on the condition of the Agricultural Labourer which has recently been published, undoubtedly shows that the housing of the agricultural labourer has not improved in an equal degree with his food, education and position generally. It is also noticeable that it is on the estates of the great landlords, who are among the best-abused people of the day, that the best cottages are to be found. The agricultural labourer is in truth somewhat careless about the state of his dwelling, and the result is that where there is not a public-spirited landed proprietor desirous of having his cottages in a sound and habitable state, the cottages are often not up to the mark, chiefly for the reason that the labourer is content with a bad dwelling. He does not set sufficient value on sanitary matters and material comfort so as to avoid cottages which are of an inferior character. It is only fair also to add that in many places the labourer has not a choice between a good and a bad dwelling. He must live within a reasonable distance of his work, and within that distance comfortable and healthy cottages are not always to be found. Here we find the need for greater energy and zeal by the rural sanitary authorities. Undoubtedly many of these bodies are very neglectful of their duties; their inspectors do not look about the country with any system or care, and the authorities do not endeavour to carry out the law. However, public opinion on the subject of the housing of the working classes in rural districts must be aroused; it is a question not only of comfort but of health.

WE have before us, in a pamphlet form, a special report on what is called the "Scott Moncrieff System for the Bacteriological Purification of Sewage."* Briefly, the system is founded on two biological changes, fermentation (and putrefaction is a kind of fermentation), and nitrification. A century ago it was discovered that the putrefaction of organic matter was due to bacteria. These are now known to be vegetable organisms (schizomycetes), whose energy is displayed in decomposing nitrogenous matter, and consequently in producing free ammonia. The second change, namely, nitrification, was, until, about seventeen years ago, believed to be of a purely chemical nature, but it has since been demonstrated that this, too, is due to micro-organisms, which act on the "free ammonia" in the presence of a salifiable base (such as lime, soda, &c.), and convert it into harmless inorganic nitrites and nitrates of that base. It is evident, although he does not say so, that Mr. Moncrieff's system is merely an attempt to put into practice the ideas expressed by Mr. Robert Warington in his paper read before the Society of Arts in 1882; we cannot do better than quote Mr. Warington's own words:—

"Sewage also contains the organisms necessary for its own destruction, and under favourable conditions these may be so cultivated as to effect the purpose. A filtering medium of pure sand and limestone, treated intermittently with sewage, will, after a time, display considerable purifying powers, the surfaces becoming covered with oxidising organisms derived from the sewage. No such medium will, however, equal in effect a porous soil rich in organic life."

Mr. Moncrieff's partial application of these ideas consists of a "Cultivation Filter-Bed" made up of layers of flint, coke and gravel (of a total depth of 14 in.), through which the sewage filters upwards; and of a "Nitrifying Channel" filled with coke, along which the effluent from the filter-bed passes for further purification. The experiments carried out by Mr. Houston showed that the filter increased in efficiency for a certain length of time, as Mr. Warington predicted, but afterwards deteriorated somewhat. In consequence of this, Mr. Moncrieff modified his plans by using two filter-beds and channels to allow for alternate aëration; this necessity of intermittency was also pointed out by Mr. Warington. But after all, the final effluent, although much improved, was far from pure; eight analyses showed that on the average no less than 0·64 grains of albuminoid ammonia remained in each gallon of effluent, nearly 50 per cent. more than Sir Henry Roscoe found in the effluent of London sewage after treatment by electrolysis. Mr. Houston's analyses, however, were made in mid-winter, a most unfavourable time for the development of bacteria. It appears probable, too, that the household sewage, on which his experiments were made, was much more concentrated than the London sewage, but no analysis whatever of the crude sewage is given, and no accurate idea of the purification effected by the process can therefore be formed. This is a weak point in the report. We are of opinion that a greater depth of filter will be found necessary, and that the best results will be obtained by allowing each filter and channel to have some hours' rest every day, instead of dosing them continuously for two or three weeks. We trust that Mr. Moncrieff will proceed with his investigations, for it appears probable that his system may be so modified as to prove really useful, seeing that its aim is to work hand-in-hand with nature, and merely to accelerate her process of purification by multiplying her innumerable army of minute scavengers.

* "Report upon the Scott Moncrieff System for the Bacteriological Purification of Sewage." By Alexander C. Houston, M.B., D.Sc. Edinburgh. Published by Waterlow Bros., Ltd., London.

AN interesting paper in the new issue of the Athenian *Mittheilungen* (1894, XIX.), is devoted to the fragments of sculpture from the Temple of Asklepios at Epidaurus, which are in part presumably from the hand of Timotheos. Up to the time of the excavations at Epidaurus Timotheos was known to us only from some late Græco-Roman copies of his works, and as one of the four sculptors who decorated the Mausoleum at Halicarnassos, the others being Scopas, Bryaxis, and Leochares. The Epidaurus sculptures are of special importance, because we know from an inscription dealing with the building of the Temple of Asklepios, and found *in situ*, that Timotheos made the *models* for the entire sculptural decoration of the temple, and, in addition, executed the figures for one of the pediments with his own hand. It is unfortunate that we are not told which pediment—east or west. The fragment selected for publication is a Nereid seated on a sea-horse, and side by side with it Dr. Winter places the Leda and the swan of the Capitol, a reputed copy of a work by Timotheos; the analogy in pose, proportions of the figure, treatment of the drapery, will not escape the most superficial observer—and the differences are just those of weakening and exaggeration that will be expected between an original and the work of a copyist. The head of the Nereid is, unfortunately, lost; but some of those from the west pediment are preserved, and are closely analogous to the Leda head. No less remarkable, too, are the points of comparison with the Nike balustrade on the one hand and some of the slabs of the Mausoleum frieze on the other. Altogether the Epidaurus fragments promise to throw a flood of light on the school of the younger contemporaries of Scopas and their relation to their predecessors.

THE eminent German archæologist Professor Curtius celebrated his eightieth birthday on Sunday last, and has been the subject of many complimentary ovations from all parts of the world. A number of admirers subscribed to a memorial in form of a bust of the *savant*, which has been placed in the vestibule of the new museum at Olympia; and the Emperor, we understand, has given the learned archæologist a much-prized distinction. Professor Curtius first visited Greece as secretary to the late Professor Brandis. This was in 1837. In 1841 he returned to Germany, and soon after held a post as demonstrator at the Berlin University. A professorship followed, and then in 1844 he was engaged as tutor to the late Emperor Frederick, who was studying at Bonn. In 1850 he took up his old post at Berlin, but temporarily left it in 1856 for a chair at

the Goettingen University, returning to the capital again in 1868 as Professor Boeckh's successor. After 1870, thanks greatly to his influence at Court, he was able to do much to encourage archæological research among his countrymen. He practically started the German Archæological School at Athens, and organised the Olympia excavations (1875-1881). It would lead too far to notice his many valuable writings. His "History of Greece," "The Excavations at Olympia," and his "History of Athens" are, we believe, the most appreciated. As an orator his name still ranks first throughout Germany. As a University teacher he is very popular.

ACCORDING to custom, the biennial gathering of the German architects was again preceded by a business meeting of the delegates of the numerous architectural societies which, together, form the *Verbund*, or Union. Much valuable research work was reported on, and a number of new subjects arranged for discussion. The reports of the various bodies on fire-resisting instruction have not yet been edited, but a *résumé* is promised for next year. Similar reports are to be collected on the salting of bricks, and the preventive measures lately introduced in various German brickfields. The Union has now practically decided to have its own journal, and there is some talk of the well-known *Transactions* of the Hanover Architekten-Verein being remodelled to answer this purpose. The new journal will appear monthly. The Union is growing rapidly, as thirty-eight societies with 7,050 members now take part in the work. Herr Baurath Hinckeldeyn has been re-elected President, Herr Pinkenburg is the Honorary Secretary. The annual expenses of the Union are about 600*l*. The next biennial gathering will be held at Berlin.

THE terrible catastrophe of the forest fire in America, the worst that we remember of a long list of similar disasters, seems to make it a duty imperative on the United States Government to take some decisive steps, at whatever cost, towards obviating the possibility of such terrible occurrences for the future. A solitary settler here and there in the midst of a forest might be expected to take the risks of his situation, but it seems absolutely wrong that towns of a considerable number of inhabitants should be allowed to remain exposed to the possibility of being burned up wholesale by the accidental firing of a forest in dry weather. There ought to be a legal enactment compelling the formation of safety zones of clearage round such towns, or possibly that of alleys of clearage isolating different portions of the forest country, so as to keep a fire within limits. The latter might, however, be too large an undertaking; but the safety zone round a town seems to be a practicable scheme, and if so, it certainly ought to be rendered compulsory by legislation.

MAGAZINES AND REVIEWS.*

IN the *Art Journal* an article on domestic architecture in Norfolk, by "Z.," gives a sympathetic and appreciative notice of a few of the best examples of the fine old brick houses of East Anglia, with woodcut illustrations of small size and no great excellence. The houses dealt with are Oxburgh Hall, Middleton Towers, East Barsham, Great Hautbois, and the vicarage and almshouses of King's Lynn. The picturesque courtyard of Oxburgh and its wealth of old furniture and embroidery might surely have claimed at least passing mention. A third article on "The New Sculpture" is continued by Mr. Edmund Gosse.

The *Magazine of Art* contains the first part of an interesting article on the pavement of the cathedral at Siena, under the title of "The Wonder at Siena," by Mr. Lewis F. Day, in which he deals with the work in the chronological order of its execution, and from that explains its apparently mad confusion. The author's drawings in illustration add to the value of the article, which his attempts at humour do not. The recent "International Exhibition of Bookbindings" at the Caxton Head is the subject of a critical notice by Mr. Will. H. Edmunds.

The sketching ground in the current number of the *Studio* is "Shrewsbury," whereof, and its fruitfulness in subject, Mr. C. G. Harper gives a sufficiently enticing account, not omitting mention of such neighbouring spots of interest as Ludlow, Bromfield, and the ever-delightful Stokesay, of which a pleasant sketch is given amongst other illustrations. Recent designs by Mr. Herbert S. Pepper form the basis of an article entitled "A New Designer for Metal-Work," by Mr. Edward F. Strange, whose enthusiasm leads him to somewhat over-rate the originality and ignore the mannerism already apparent of even this new designer, as shown by the illustrations given. The article "On Gesso, and some Designs in a Competition for a Finger-plate," by Mr. Matthew Webb, is useful in its criticism of what is and what is not suitable design for gesso, and with its hints on treatment, a valuable addition to the excellent article by Mr. Walter Crane in a former number.

The *Antiquary* continues its series of "Notes on Archæology in Provincial Museums" with a description of the principal objects of antiquarian interest in the museum at Northampton, written by M. Roach le Schouix. The address delivered (as President) by Sir Henry Howarth at the recent Shrewsbury meeting of the Archæological Institute is printed *in extenso*, and is well worth careful reading as an exposition of the fundamental principles of archæology, or, as the title expresses it, "The Methods of Archæological Research."

The *English Illustrated Magazine* gives us an article by Major Ricketts on the charmingly picturesque mansion, five miles from Maidstone, known as Leeds Castle, though it is scarcely strictly correct to call it "The Moated Castle of Leeds," as it is rather a castle in a lake, and the greater part, even so, dates no further back than 1822. Several sketches give a fair idea of the picturesque character of the house and its surroundings, though its greatest charm, that of colour, is necessarily absent. "Memories of Prato," by Mary F. Robinson, is an interesting account of the little Italian city, with some excellent illustrations of the cathedral and the pretorial palace.

The *Gentleman's Magazine* contains a gossippy article on "Diocletian's Palace at Spalato," by Mr. Percy Fitzgerald, chiefly made up of excerpts from the writings of Robert Adam, T. G. Jackson, Lady Strangford, and Sir Gardner Wilkinson; well adapted, therefore, to excite the interest of those to whom the existence of Diocletian's magnificient home is almost unknown, but of little value to those who would wish to know something definite of the architecture of this interesting example of Roman architecture of the later Empire.

In the *Fortnightly Review* there is an account of "The Work of Mr. Pater," by Mr. Lionel Johnson, well worth reading for a description of the writer whose work is justly to be highly esteemed, whether as artistic literature or as valuable criticism on many and varied forms of artistic work. We find also an article on "The Museums of Paris," by Mr. Frederic Harrison, which contains wholesome instructions for our municipal rulers and guidance for our students who aspire to be "professors of plaster and brick," even though they be flaunted by the author's somewhat unnecessarily reproachful term, "*genus irritabile structorum.*"

The *Pall Mall Gazette* has a topographical paper on "Westminster" by Mr. Walter Besant, which in its present Chapter I. brings the history of the city without citizens to the time of King Cnut the Dane.

In the *Nineteenth Century* articles which may have interest for our readers are to be found in the conclusion of Prince Kropotkin's "Mutual Aid in the Mediæval City;" and a reply to "Mrs. Sydney Webb's Attack on the Labour Commission," by Mr. Geoffrey Drage, secretary to the Commission.

Major C. R. Conder, in his article on "Palestine Research—Past and Future," in the *Contemporary Review*, summarises what has been done, and speculates on what may be done, in the way of exploration in the Holy Land, especially emphasising the importance of the investigations amongst the evidences of Hittite activity.

The article on "Playgrounds for City Schools," by Mr. Jacob A. Rüs, in the *Century Magazine*, is an astounding revelation of the utterly insanitary condition of too many of the public schools of New York, which is surprising in the extreme, and shows a callous indifference to the actua existence of her youthful citizens, which is but too general in America, where, it must be feared, the conditions of life for the "masses" are often far harder than can well be paralleled in this effete old country.

Scribner's Magazine has an article on "The Tapestry of the New World," by Fanny D. Bergen, which attempts to reduce to something like system the favourite designs of patchwork quilt-makers, some of which seem to have remained in vogue from fifty or sixty years ago to the present time, and whose ancestry might doubtless be traced through "Colonial" days to the still older traditions of the mother country.

Harper's Magazine shows that Japan and all things Japanese are still reliable fetish with which to attract the American public, by the inclusion of a paper on "Early Summer in Japan," by Alfred Parsons, excellently illustrated and eminently readable. More sterling in educational value is the article on "Some Records of the Ice Age about New York," by T. Mitchell Prudden, pointing out how visible even to-day are the evidences of the great glacial epoch, when North America north of the parallel from San Francisco to New York was covered with ice fields.

Members of the Hellenic Society may be recommended to read Mr. Andrew Lang's witty and good-natured banter in *Longman's Magazine*, under "The Sign of the Ship," on the manner in which speculations on points of Greek archæology are sometimes carried on now-a-days. The satire is not uncalled for. In the same magazine is the concluding number of Mr. Trevor-Battye's "White Sea Letters," which contains some interesting information as to Archangel and other localities of the neighbourhood.

Cassier's Magazine deals with American engineering in a series of articles, readable by the laic as much as by the professor, and dealing with such diverse subjects as "The Ferryboat of To-day," "Modern Lighthouse Service," "First Stationary Engines in America," "The Earliest Ironclad," "Refrigeration from Central Stations," "The First Steam Screw Propeller Boats," "Biography of Dr. Henry Morton," and "The Ideal Preparatory School for Engineering Students," pleasantly written and excellently illustrated.

THE TRADES' UNION CONGRESS.

THE twenty-seventh annual Trades' Union Congress opened on Monday at Norwich, when Mr. F. J. Delves was elected President.

The Parliamentary Committee's Report, presented by Mr. Charles Fenwick, M.P., contained the following passages:—

Federation of Trades.

"The instruction given to us by the last congress, to prepare a basis of federation for the purpose of bringing all trades and labour organisations into closer touch and sympathy with each other, is one which has been considered by several previous congresses. Only four years ago the Parliamentary Committee carefully considered the question, and prepared a code of rules which were submitted to the trades, but without any result following therefrom. The committee at that time were of opinion that 'a federation, to be really powerful, should be exclusively composed of trades already organised on a sound financial basis, capable of successfully grappling with any ordinary difficulty, and only needing the assistance of the federation in cases of great emergency.' We have thought it desirable to reproduce the rules prepared by our predecessors in office, copies of which will be supplied to each delegate attending the congress.

Labour Commission.

The final report of the Labour Commission was presented to Parliament in June last. It is scarcely necessary for us to say that the Commissioners are hopelessly divided in their opinions on almost every question of importance that came within the scope of their inquiry. We have, therefore, nearly as many reports of one kind and another as there were members on the Commission. Your committee clearly foresaw this difficulty at the time when the Commission was appointed, and entered a strong protest against the overwhelming balance of representation given to

* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

the capitalist interest, as compared with that given to the interests of Labour. The result of the inquiry has more than justified our representations to the Government against the unfair manner in which the Commission was constituted. After all the money and valuable services which have been expended upon this inquiry, it was most unfortunate to find that no immediate practical results are likely to be derived from it. An important suggestion is made by a small—though influential—section of the Commission to the effect that trade unions should be invested with 'corporate powers,' wherever they desire to possess the same. This suggestion is one which will require to be carefully watched, otherwise alterations of an important character may be made in the law relating to trade unions, the effect of which may completely change the constitution of these societies. Further reference to this matter will be made in a separate paper, which will be placed before you during the course of the week.

Bills of the Session.

Notice of Bills dealing with the following subjects was given at the commencement of the session—viz., Conciliation; Cotton Trade (Forty-eight Hours); Eight Hours, or Forty-eight per Week, for all Trades and Industries; Factories and Workshops, Fatal Accidents Inquiry (Scotland), Jury Law Amendment, Merchandise Marks, Mining Accidents in Scotland, Nationalisation of Mines and Minerals, Old Age Pensions, Plumbers' Registration, Shop Hours, Steam Engines (Certificates for Persons in Charge), Tramways, and Workmen's Dwellings. These Bills were either so unfortunately placed in the ballot that they were not introduced, or had to be ultimately abandoned for want of an opportunity to deal with them.

Limitation of Hours.

The Mines Eight Hours Bill obtained its second reading on April 25 by a majority of eighty-seven votes. The Government having pledged themselves to give 'facilities' for its further consideration, the Committee stage was reached on August 13, when an amendment was accepted limiting its operation to a period of five years. A further amendment was proposed in favour of local option in the following terms:—

'In any district as hereinafter determined in which a majority of the workmen employed underground in the mines therein shall so resolve in manner hereinafter provided, and so long as such resolution shall remain unrescinded.'

After considerable debate, we regret to say that this amendment was carried by a majority of five votes, and the Bill was thereupon withdrawn.

Reduction of Hours.

The following table, compiled from the *Labour Gazette*, shows the extent by which the hours of labour have been reduced in various industries throughout the United Kingdom since September, 1893:—

Reduction of Hours.	No. of Persons Affected.
By 1 hour per day	60
,, 2 hours ,,	221
,, ½ hour per week	1,172
,, 1 ,, ,,	2,809
,, 1½ hours ,,	3,000
,, 2 ,, ,,	767
,, 2½ ,, ,,	1,173
,, 3 ,, ,,	925
,, 3½ ,, ,,	442
,, 4 ,, ,,	1,060
,, 4½ ,, ,,	260
,, 5 ,, ,,	2,179
,, 6 ,, ,,	1,880
,, 7 ,, ,,	37
,, 7¾ ,, ,,	24
,, 11½ ,, ,,	46
,, 12 ,, ,,	35
,, 12¾ ,, ,,	30
,, 16½ ,, ,,	18
,, 19½ ,, ,,	8
,, 24 ,, ,,	22
,, 25½ ,, ,,	8
,, 28 ,, ,,	332
Total	16,508

To 48 hours per week, 91,313. In this latter case we have included the employées in Government Departments, many of whom have also received an increase of wages varying from 1s. to 2s. per week, involving an additional charge upon the Estimates of 30,000*l.* per annum.

General Remarks.

Shortly after the Belfast congress, the chairman of your committee wrote to the President of the Local Government Board, calling his attention to the large number of able-bodied workmen who were unable to find employment, and requesting that a circular should be sent to the various local authorities, urging upon them the necessity of providing for such cases as far as possible. The President of the Board at once replied in sympathetic terms, and a circular was issued, which in many cases we believe was followed with beneficial results. The dispute which existed in the coal trade at the time of our last meeting, and which lasted over sixteen weeks, was successfully brought to an end through the mediation of the present Prime Minister, the workmen returning to work at the old rate of wages. A board of conciliation was afterwards established for the purpose of dealing with wage questions in future within the area of the federated district . . . . Towards the end of the month of June last nearly the whole of the miners in Scotland left their employment, in consequence of a demand for a restitution in their wages amounting to 1s. a day. The prolonged character of this dispute is causing much inconvenience in other industries dependent on the coal trade. Various efforts have been made to bring about a satisfactory settlement of the dispute, but without success. The workmen's representatives have made strenuous efforts to obtain funds sufficient to enable them to carry on the conflict, and so far have succeeded fairly well, but more liberal assistance is greatly needed. Trade on the Tees, Wear, and Tyne has been greatly depressed for some considerable time past, no doubt in consequence of the demand made by the ironfounders and pattern-makers, who asked for an advance equal to the reductions made some time ago in their wages, and which were promised to them on the revival of trade. We regret to say that there is no immediate prospect of a settlement, the dispute having existed since March 19 of this year. In conclusion, we would strongly urge upon you the importance of providing, as far as possible, some more rational and less barbarous method of dealing with these questions, either by arbitration or boards of conciliation, so as to prevent the suffering and misery which invariably accompany a strike or lock-out."

The President's Address.

In the course of his Presidential address on Tuesday, Mr. Delves said, the present state of Labour conditions was over-population followed by stagnation. This travesty of industrial organisation was brought about by the fact that markets dominated men, instead of men controlling markets. The only direction in which they could look for an ultimate solution of their industrial problem was that of Collectivism. What Unionists must do for themselves Parliament must do for workers as a whole. He did not think that one uniform day of eight hours could at once be forced in all trades. Perhaps each trade must be left to determine for itself whether it should come under a trade exemption clause; but trades must work together. It must be trade exemption, and not local option, unless organised labour was to be swamped by unorganised employed labour. They must insist on steps being taken immediately to relieve the Labour market. The age of child labour must be raised. Women must be paid the same as men and treated as their equals, hours must be reduced, and the unemployed must be absorbed; and instead of fighting for work they must divide it. He was opposed to preventing pauper immigration. The remedy was to be found in strict sanitary laws and in perfect trades organisation. In concluding his address the President said he hailed the work of the London County Council in the elimination of the middleman as a long step in the right direction. Here was the ultimate safeguard against sweating and scamping. In reference to the Employers' Liability Bill, its abandonment in the Commons after its destruction in the Lords, had his entire approval. Delays caused by sticking to their principles were in such cases shorter than those involved in the acceptance of a compromise. In another part of his address Mr. Delves said, in winning the reforms of which he had spoken, they must fight everything which undermined the character of their fellow unionists. Was he too sweeping when he said that they had more to fear from drinking and gambling than from all the capitalists put together?

Following a vote of thanks to Mr. Delves for his address, the congress proceeded to discuss the report of the Parliamentary Committee, after which they adjourned for the day.

Inspection of Public Works.

On Wednesday, Mr. John Ward moved, and Mr. A. Humphreys seconded, the following resolution: "That in the opinion of this Congress it is highly desirable that competent practical inspectors should be at once appointed to supervise the construction of all public works requiring the sanction of Parliament."

Mr. John Burns drew attention to the Parliamentary Committee's report on this point, and said that they had convinced the Home Secretary that it was necessary that this should be done, and it would be included in the New Factory Act.

Names of Contractors.

Mr. Robert Knight (Newcastle), moved: "(a) That this Congress instruct the Parliamentary Committee to take immediate steps to bring pressure to bear upon the Government to have the names of all contractors entering into contracts with the Government, also the nature of the contracts entered into, and in what portion of Great Britain or Ireland such contracts are being executed, printed and placed in the Lobbies of the House of Commons, or in some other convenient place of access to Members of Parliament, so that the member or members of any constituency can, on application being made to them for such information, supply the same without giving notice of the question to heads of departments, and thus prevent delay of information; (b) we also ask the Government, for the convenience of the public, to record in the next number of the *Labour Gazette*, appearing after such contract has been let, the same information as they are asked to supply to Members of Parliament."

Mr. Sheldon (Dublin) seconded, and Mr. Tom Walker supported the resolution. The latter gave instances of the way in which Government work was done, and said that that work was always done at the cheapest possible rate. He suggested that the remedy was the direct employment of labour.

The resolution was carried.

Hours of Labour.

Mr. J. Jenkins moved:—"That this Congress urges upon the Parliamentary Committee to introduce a Bill into the House of Commons fixing the hours of work in bakehouses at eight per day or forty-eight hours per week."

Mr. H. Emery (Hanley) seconded the resolution.

Mr. Ben Tillett moved to insert after the word "Bakehouses," the words "and all other trades and occupations."

Mr. Jenkins and Mr. Emery at once accepted Mr. Tillett's amendment, and the chairman was about to declare the resolution carried unanimously, when a division was challenged, and the voting was—for the amended resolution, 256; against, 5.

Compensation for Loss of Tools.

Mr. Reid (Glasgow) moved:—"That this Trades Congress is of opinion that employers shall be responsible to workmen for loss and damage to tools by fire while on their premises, and that the Parliamentary Committee take steps to have this resolution carried into effect."

Mr. Parnell seconded the resolution, which after discussion was carried.

Employers' Liability Bill.

Mr. J. E. Collins moved, and Mr. Bowen seconded: "That the Parliamentary Committee be instructed to press upon the Government the necessity of at once re-introducing the Employers' Liability Bill."

Mr. Ward moved the suspension of the Standing Orders so that the whole question might be discussed.

Mr. Will Crooks moved as an amendment: "That this Congress heartily approves of the Employers' Liability Bill as introduced to Parliament in the last session of the House, containing as it did the principal points for which we as workmen have contended for years; the most important being the provision against contracting out of the Act, without which no measure will be acceptable to the workers of the United Kingdom. We, therefore, call upon the Government to re-introduce the measure, and further instruct the Parliamentary Committee to insert a clause making employers financially and criminally liable for all accidents caused by defective plant and machinery."

Mr. P. Curran seconded the amendment, which was carried unanimously.

Mr. Thorne moved to add words which would compel employers to give a statement of their case before any action for injury was tried. He said that all those who had any experience in the working of these actions would realise the necessity for this amendment.

Mr. Sexton seconded the amendment, which was agreed to unanimously, and the amended resolution was also accepted.

No. 1.

No. 2.

No. 3.

No.

Sketches in Gloucestershire and Worcestershire, by Ernest C. Bewlay.

No. 5.

No. 6.

SKETCHES IN GLOUCESTERSHIRE AND WORCESTERSHIRE.

THE first sketch is of a very fine ruined Tithe Barn at Sudeley Castle, a large house, for many years left in a very ruinous state, but restorations were very judiciously made by the late owners, and now, with the exception of the banquetting-hall, it is mostly inhabitable.

No. 2, at Broadway, is a fine example of a house of the early part of the fourteenth century, with later additions of the fifteenth. The earlier part of the house contains a small hall with good oak roof, a solar, and a very small chapel on the upper floor, lighted by a traceried window of two lights. It is built of the local stone, which, toned by age, is of a lovely colour, and covered with stone slates.

No. 3 is an example of many that might be given of interesting stone houses and cottages for which Broadway is so justly celebrated. The detail in most of these houses is very good and refined, and their charm is very much enhanced by the picturesque way in which they are dotted about the long, wide, and straggling village street.

No. 4 is a very fine stone house at Aston Subedge, adjoining the church, L-shaped in plan and more interesting externally than internally.

No. 5 is a Lodge at Chipping Campden, and what was Campden House, a very much illustrated and described mansion which was burnt down, only a few picturesque ruins now remaining.

No. 6, a "Smithy" at Chipping Campden, is not of any architectural interest, but noticeable in this district, where all stone cottages, almost without exception, are roofed with stone slates, for its thatched roof of exquisite colour.

ERNEST C. BEWLAY.

COMPETITIONS.

PUBLIC HALL, CLEETHORPES.—The competition for a Public Hall at Cleethorpes, Lincolnshire, has just been decided as follows:—First premiated design, Mr. John R. Withers, St. Mary's-court, Shrewsbury; second, Mr. Solomon Ford, 3, Queen-street, Cheapside, London, E.C.; third, Mr. J. Mitchell Bottomley, 28, Albert-road, Middlesbrough.

DEVON VOLUNTEER COMMEMORATION.—On the 31st ult. the Devon Volunteer Commemoration Committee held a meeting at the Exeter Guildhall, under the presidency of the Mayor, for the purpose of further discussing the designs submitted to them. The designs under consideration bore the mottoes "Exon," "Jan Ridd," and "Fortiter." The majority of the votes were given in favour of the design "Exon," and on the sealed envelope being opened it was found that the author of this was Mr. S. K. Greenslade, A.R.I.B.A., of University Hall, London. Mr. Greenslade enclosed, under cover, a tender from Messrs. H. Hems & Sons, Exeter, who undertook to carry out the work and erect the memorial to the satisfaction of the committee for the total sum of 200*l.*, including architect's charges. The committee resolved to adopt "Exon's" design, subject to the City Council assenting to its being placed on the Lower-terrace, outside the Assize Courts, on Northernhay. The memorial takes the form of a pedestal raised on two steps, and surmounted by a square shaft, having a cap with the Royal Crown as a terminal. There are four panels. On one is the profile of Dr. Bucknill in high relief, and on the other panels inscriptions are to be inserted. Above the panels are medallions in which will be inserted the figures 1852, 1894, the monogram "V.R.," and the City Arms. The memorial will be over 20 ft. in height. The premium of 5*l.* was awarded to the author of "Fortiter," subject to the provision that the Council assent to "Exon's" memorial being erected as proposed. This design was the work of Messrs. J. Whitehead & Sons, of Aberdeen.

*** WE cannot accept any statements of the result of competitions except from public announcements or from official communications.

THE GLASGOW SCHOOL OF ART.—The results of the examinations and competitions in connexion with the Science and Art Department received for this school, says the *Glasgow Herald*, show that the past session has been very successful, the school fully maintaining the high position it holds amongst the schools of art of the United Kingdom. In the national competition 32 medals and Queen's prizes have been received, being 11 more than last year. These comprise 1 gold medal (out of 9 granted to the whole kingdom), 2 silver medals, 14 bronze medals, and 15 Queen's prizes. The gold and silver medals, together with 4 bronze medals and 5 Queen's prizes, are awarded for architecture, 7 bronze medals and 1 Queen's prize are given for design, 2 bronze medals and 8 Queen's prizes for modelling, and a bronze medal and Queen's prize for life drawing. Three national book prizes are also awarded for the special excellence of individual sets of works. Thirteen free scholarships of the value of 3*l.* each have been granted to artisan students of the evening classes. In the advanced local examinations 640 passed (283 first class and 357 second class) are registered. Of the six students submitted for the three days' architectural design examination, two passed excellent, three passed first class, and one second class. The "Haldane" scholarship, value 50*l.*, was awarded for the seventh consecutive year to the school. The "Alexander Thomson" scholarship of 60*l.* was also gained by a student, as also a Royal Academy three years' studentship in architecture. Eight students have obtained situations as designers, teachers, &c., through the agency of the school.

Illustrations.

THE "PARK" HOSPITAL.

WE publish this week the general plan, and the details of two classes of wards, of the accepted design for this hospital, by Mr. Edwin T. Hall. As we consider it an exceptionally well-planned building of its class, and one in which the details have been very fully considered, we give the architect's descriptive report nearly in full :—

"REPORT, SPECIFICATION, AND ESTIMATE.

Block Plan.

The problems presented to architects in designing this hospital were how to conveniently dispose the various buildings on a very irregular site varying in level from north to south 31 ft. and from east to west 23 ft. with the necessary condition of avoiding steps in the various channels of communication on the ground floor.

In this design the author submits to the judgment of the Board his solution of these problems.

Speaking of the scheme generally, the author wishes to submit that he has paid great attention to the architectural grouping and treatment of the whole.

While avoiding any outlay that can for a moment be classed as extravagant, an endeavour has been made in the composition to attain quiet dignity and reposefulness with pleasant detail, and with these ends in view it has been sought to retain, as far as possible, the surrounding trees, which on sanitary grounds are desirable. It may be noted in this connexion that the superintendent's house has been placed in part of the pleasure garden of the old house.

The composition, then, consists in a group of picturesque buildings by the entrance to the right, mostly of one story, between which the road leads to the centre block. In this position a three-storied residence, with recessed front and flanking gables, terminating in a wavy skyline, screens from view the less interesting business department of the administration. Well in advance, and at the foot of this, is a one-storied block, studiously plain in design, which serves to give scale to the residence itself, while high above it, to the rear, is the clock and water-tower, with its steep roof.

Right and left at wide intervals range the eight pavilions, which face towards the road, terminated with their apparently-detached towers, which serve to emphasise the whole design.

Dealing with the question of levels, the author has fixed, on a level floor to the main corridor, the full width of the central group of buildings. From this level easy gradients follow the general rise or fall of the ground in various directions. As the main corridor is connected with pavilions, which are necessarily different in level, an arcade cloister treatment is given, the curved lines carrying the eye from one block to the other without offence.

This corridor, which from end to end of each group of pavilions carries the airing balcony for first-floor wards, is, between the groups, kept down to a height of about 10 ft.

Convenience of access being of importance, the entrance gate has been placed at the nearest point to the main road from London. The gates open into a roadway 30 ft. wide, and are flanked on the one hand by the porter's lodge and residence of the medical superintendent, and on the other by the block for discharge of patients, while immediately in face are the offices for general supervision. The road opposite these offices branches right and left, and is continued 20 ft. wide all round the hospital. Adjoining, and on the east side of the discharge block, is that for medical education, with which is incorporated the laboratory and post-mortem rooms, and, naturally, the mortuary is placed behind these in a position to which bodies can readily be removed from the hospital by the corridor at the west of the central administration buildings, and from which they can be removed directly to the road.

To the east of this block the steward's residence commands the cartway entrance to his stores yard.

The hospital entrance and reception block is placed in a central situation. The middle door and hall are for the staff and for business visitors to the matron and others, all being under the control of a porter. On one side of this hall are the rooms for ambulance nurses and the night superintendent, on the other the general waiting-room for visitors to patients, with cloak-rooms attached. The east and west doors in the block give access to the patients' examination-rooms for the diphtheria and enteric wards on the one side, and for the scarlet-fever wards on the other, accessible through the corridors to left and right.

Behind, and rising far above this one-storied block, are the residences for the matron and female servants, and the male servants, and the kitchen and steward's stores, with large yard.

The matron's quarters have been placed in the female block rather than in a separate house, because she has thus her subordinate female officers near her. She is close to her office and needle-room, and at the same time is readily accessible to visitors.

All these buildings are central for the general service of the hospital, and it has been sought to make them also very open to both sun and wind, while internal aëration has been carefully studied.

To the east of these buildings is the residence of the assistant medical officers, in convenient contiguity to the entrance to the diphtheria wards, and equally convenient for service from the kitchen.

To the east of the central administrative block are the pavilions for diphtheria and enteric diseases. These are disposed on two floors, the upper floor approached by a staircase and lift placed internally, but approached from the outer air quite separate from the lower ward entrance.

If it should be requisite at any future time to add other short pavilions to the south of the corridor, space has been left for the purpose, in which case it is suggested that one staircase and one lift (marked E on plan) would serve both north and south blocks, as described further on in relation to scarlet-fever wards. The roof of the main corridor is made to serve as an airing balcony at the south end of the upper wards, and it is hoped it would prove a boon to the patients able to bask in the sun.

The height from the ground floor level of the diphtheria wards to the eaves of the roof of each block is 30 ft., the space between each pair of twelve bed wards being 76 ft.

To the south, distant 150 ft. from these pavilions, is the nurses' home. This position has been chosen for the following reasons:—It is handy for service from the general kitchen, it is almost equally convenient for nurses in the diphtheria, scarlet, and isolation wards. It is in the quietest position, and to the houses on adjacent properties it is free from the objections attaching to the proximity of any other hospital building. The bedrooms for night nurses are at the east end, at the remotest distance from the necessary noise attaching to the service and day work.

The dispensary faces the infirmary in a central position.

The infirmary is to the south of the central administration blocks, and where there are attached wards provision is made for through currents of air.

Between this building and the kitchen is a tower to support a large water-tank, for primary use in the event of fire. The tower is also utilised for a clock, and also for the necessary telephone exchange and fire-alarm indicator. It will have a lightning conductor.

To the west of the centre, in the front, are placed eight pavilions of two stories each for scarlet fever, of the same height as the diphtheria wards, and at similar distances apart. Two separate arrangements for access to the upper floors are shown, the first with internal warmed staircases. This necessitates a staircase and lift to *each* pavilion north and south of the corridor. An alternative arrangement is, however, shown on the $\frac{1}{10}$ scale drawing, and illustrated by $\frac{1}{4}$-in. scale details, by which one staircase and lift are made to serve for the two pavilions. It is proposed to treat this staircase in all respects as a part or continuation of the open corridor. It is suggested that the arguments in favour of the open corridor would justify this treatment on sanitary grounds, while the manifest economy of working one lift is submitted as a justification for the arrangement. If this be adopted, a nurses' duty-room may be attached to the large twenty-bed wards, and, with so many beds, this may be found a great convenience for the transaction of the statistical and report work.

To the south of the scarlet fever hospital are placed the isolation wards, served from a separate corridor.

The laundry and workshops are placed at the south-west corner of the site, in an inconspicuous position, but, as they should be, in an open spot. They are high, so that all smoke, &c., may be carried well above the hospital wards.

In the yard are steeping tanks for foul articles.

Attached to the staff laundry is a good bleaching-ground. The artificer's shops, engine-room, &c., surround a yard, which enables everything to be kept tidy.

It will be noted that the general trend of all the wards is north and south, giving the maximum of sunlight to all walls. Windows are also placed close to the angles of the wards, so that no part may be left untouched by the sunlight.

The wards are protected from the cold north winds by towers containing the baths, water-closets, &c., and in like manner the airing-courts are protected by walls.

Description of a Ward.

A description of one large ward will suffice for all, premising it by saying that the specified wall space, floor area, and cube have been strictly adhered to. The ward, then, is 14 ft. in clear height. It is approached from the main corridor and it has at its other end an external staircase for fire-escape and for subsidiary access to the airing-court. The floor of the lower story is placed at an average of not less than 4 ft. above the ground. The floor is of steel and concrete, covered with inch polished wainscot bedded in bituminous mastic directly on the concrete, leaving no space whatever beneath. The walls are without skirting or any other projection, all angles being rounded.

The heating is by open fires and hot-water radiators. There are four open fires in the centre of the width, so arranged that all parts of the ward get a share of radiant heat, while every patient is able to see the fire. The brick stack between the floor and the mantelshelf is entirely faced with glazed bricks of a quiet tint. There is no chimney-piece, but the glazed bricks form the fireplace, the fire being on the floor, the hearth being raised. The fire is fed by air drawn from above the floor under the hearth, and this forms an outlet ventilator for the heavy air in the room.

At the ceiling level it is proposed to construct a longitudinal air-shaft of metal. This is to withdraw the super-heated air from the top of the room, and will be fitted with valves.

Fresh air is introduced through a grated aperture from without into the bottom of each of the radiators placed under alternate windows.

These radiators serve to supplement the heat from the open fires, and as the centres from which heat is obtained are thus distributed around the walls and in the middle of the room, an equable temperature can be obtained.

Each window has a pair of sashes and a transom light hung with butts and worked by an Adams' rod-opener. All windows are carried up to the ceiling, by which means greater cleanliness and more reflected light is obtained. Narrow windows are also placed close to the angles of rooms, as before noted.

The doors to the large ward are to be hung in a pair with check-action swing-hinges. The doors have fanlights carried up to the ceiling made to open for through currents of air.

The lobbies, bath-rooms, passages, and internal staircases are heated by similar water-radiators and the small ward by open fire and radiators. The construction of windows, &c., is, in all cases, similar to that in large wards.

All bath, lavatory, and sink external wastes discharge with rounded shoes into open trenches and thence to gulleys placed 18 in. from the walls.

The lavatories have been purposely placed where they are readily visible by the ward nurse on opening the door from ward. This enables better control to be maintained, especially in the case of children.

A separate lavatory and water-closet have been attached to each two-bed ward the lavatory in all cases forming a cross ventilation ante to the water-closet.

A similar arrangement is adopted for the nurse.

Generally.

The same principles have been adopted throughout the hospital and it is, of course, unnecessary to repeat a description of them.

It may, however, be appropriate to mention that the modes of placing all the baths, water-closets, &c., in a "disconnected" tower has been adopted for nurses, matrons, and servants' houses, stores, kitchen, and laundry; indeed, for all but the private residences, and in all cases (as in the nurses' home) where there are corridors leading to the towers, two pairs of windows are placed in the neck or bridge, with a door between, so that while the tower is cut off by the door, there is ventilation to the corridor.

It may now be convenient to describe the general arrangements in more detail :—

Power.

The boiler-house for the entire service of the hospital is placed as part of the laundry block.

The boilers are under the drying-closets of the laundries, so placed because the heat there is of service, and because the arrangement lends itself to convenience in several ways. Thus, while the face of the boilers are in a lofty well-lighted and ventilated chamber some 18 ft. high, the steam pipes are taken from the back direct through a subway to the south main corridor. Coal vaults containing about 150 tons are at the rear or south of the boilers, accessible to carts from the back road, and thus the place is kept free from dirt.

The total nominal h.p. provided is adequate to allow of one boiler always being out of use as a stand-by.

The engine-room is made large to give ample space. It is proposed to have separate engines to work the laundry and the electric plant. These have each special work to do, and special types are more economical for the work to be done respectively.

This room will contain the accumulator for the high-pressure lifts, the fire-engine, &c., to be described later on.

It will be noted that a convenient yard is attached to the engine-room for stores, repairs, &c., and adjacent to it an open store for an additional 120 tons of coal.

Lifts.

It is proposed to have nine hydraulic direct-acting high-pressure lifts for the general service of the wards. These will each have cages about 7 ft. by 4 ft. to take a patient lying down. There will be one in each of the four diphtheria pavilions, one to each pair of scarlet-fever pavilions, and one in the most eastern of the isolation pavilions. The author has not thought it necessary to put a lift to each isolation pavilion, but has left a place so that this may be added at any time.

A suspended hydraulic lift is provided in steward's stores, capable of raising 10 cwt. at a time.

A similar lift is provided at the west end of the nurses' home to raise coals, &c., to the upper floors,

and at the east end a hand-power lift is also provided as an auxiliary.

All exhaust water will be pumped back for re-use.

Heating.

The heating is proposed to be by low-pressure hot water. A separate circulating service will be taken to each pavilion, and to the infirmary.

Hot-water Supplies.

The hot-water supply to baths, lavatories, sinks, &c., throughout the wards, infirmary, and central-residences, nurses' home, kitchen and scullery, will be on a similar system but kept quite distinct from that for warming. The natural rise of the ground favours a rapid and hot circulation to every part.

Lighting.

The lighting throughout all buildings including residences will be electric. The roadway within the hospital curtilage has been similarly lighted. The engine plant to be used consists of three large and one small engine and dynamo combined of the "Brush Falcon" type. Two of the large ones will supply the full demand, the third being a stand-by in case of break down. The small one is to take the night service when the lights are down.

Telephones.

In complying with the condition that there should be telephonic communication throughout, the initial expense and maintenance had to receive consideration, and the author has worked out the schedule hereto appended at page 29 [author's report], showing fifty-two stations.

It is proposed to adopt Hunning's transmitter at each station, and to have a central exchange in the water-tower.

Fire Alarms.

The author proposes to fix at each of the points enumerated hereunder electric pulls or pushes, each one of which will ring alarms at three points at the same time — namely, at the engine-room, at the men's quarters, and at the gate-lodge, while an indicator in the tower exchange will notify the place of origin of the alarm.

Schedule of Fire Alarms.

One at the entrance end of each ward .	36
One in the female servants' home	1
One in the men servants' home	1
One in the stores.....	1
Two in the nurses' home	2
Three in the infirmary	3
One in the laundry	1
Total	45

Fire Appliances.

It is proposed to place a cast-iron tank, to contain 30,000 gallons, or, say, 130 tons of water, at the top of the central tower. The intention is that this reserve shall always keep the fire-mains charged at a pressure to well command the highest part of the hospital, so that at the first outbreak there may be water available. It is probable that this supply alone would effectually control any fire likely to arise.

Off the 4-in. service mains 3-in. branches will be taken to sixty-one hydrants.

Kitchen Fittings.

It is intended to do all the cooking by steam and gas. The steam will be from the main to heating-chamber. The kitchen will be fitted with roasting and baking ovens, steam-jacketed boiling-pans for meat, soups, stews, &c., boiling vessels for water, beef-tea pans, &c., all of the most modern type.

The scullery will have wooden, copper-lined sinks, tanks for vegetables, cabbage boilers, potato steamers, &c.

Laundry, &c.

The disinfecting apparatus proposed to be used is Lyons' patent.

Steeping tanks are provided in the yards in a convenient position out of the traffic run.

On the plan the general arrangement of plant in the laundry proper is shown.

It is of the most modern type, and hardly needs detailed description. Attention is, however, drawn to two or three points. 1. To obviate the wear and tear of clothes in the boiling tanks by use of the ordinary copper-sticks, it is proposed to have the tank fitted with galvanised iron cage, lifting gear and overhead traveller for running the cage into the rinsing tank.

2. The wash troughs are to be of enamelled porcelain.

3. The drying closets are fitted with horses of the usual modern type, but the drying is not as in old times, by natural evaporation. It is proposed to fit, where shown, a steam-heated battery, drawing air from the ironing-room, and driving about 5,000 cubic feet of heated air per minute through the closet at a maximum temperature of 135 deg. This ensures rapid drying.

The receiving and delivery rooms will be heated by steam-pipes.

The airing-room has been kept distinct from the ironing-room. This is better in many ways.

The whole building is well lighted by a large lantern, extending from end to end, and, in addition, by windows where most required, as shown on plan.

The extraction of steam is by means of a 36-in. fan at the east end. The shaft is proposed to be of stock brick, with a stone cap, as shown, fitted with a lightning conductor.

Attached to the shaft is a Crane's destructor, as required.

Materials for Building.

The materials proposed to be used in the construction are as follows:—

Concrete in trenches, 1 part of blue lias lime and 5 of gravel ballast and sand.

Concrete in floors, 1 cement to 4 coke breeze.

Stock bricks are used throughout, with dressings and mouldings of red bricks.

Copings to be of red terra-cotta.

The inner face of walls of laundry and soda-store are of glazed bricks, and so are the faces of boilers.

The columns and entablature of the education block, &c., to be of Portland stone.

The floors to be of steel girders and concrete, in all but the private residences, where they are proposed to be of fir of the usual construction.

The covering of floors in sanitary towers, water-closets, lavatories, corridors, airing-balconies, stores, basement, coal-stores, staff-scullery, and similar places, is of granolithic cement.

Ward floors of polished wainscot; others of deal.

Roofs are to have on the rafters boarding, felt vertical battens, slating battens, and Bangor slates, except in the case of the medical superintendent's residence, where Broseley tiles are proposed to be used.

Walls and ceilings of buildings for patients and of disinfector are finished with Parian cement, ceilings of corridors with trowelled Portland cement, walls and ceilings of residences generally with plaster.

Drainage.

Particular attention is drawn to the drains and notes on the block plan.

The drainage scheme is there described and shown in some detail.

The scheme may generally be described to contemplate:—

1. The separation of all drains of infected buildings from all of non-infected buildings.

2. The effectual ventilation of all foul drains.

3. At the head of the drains, where advisable, the bath-wastes have been taken to syphon-flushing tanks, so that a volume of water may periodically flush or scour the drain.

4. It is assumed that the rain-water must, in compliance with the Act, go into the sewer, otherwise it might be taken to an ornamental pond, and, if thought desirable, it could be pumped up for use on the premises. Its volume is considerable.

Airing Courts.

The whole of these courts and the space under pavilions is proposed to be paved with granolithic cement.

Roads and Paths.

The roads are proposed to be 4-in. coarse core, 4-in. burnt ballast, and 4-in. gravel. They will be drained into the main rain drain. These roads will all be electrically lighted.

Fencing, &c., and Laying out Grounds.

Having regard to the trees about the whole boundary, in many cases close to the fence, it is not thought desirable to build brick walls, as the roots would in time crack and twist them. It is therefore proposed to use 7 ft. oak "park" fencing for the general enclosing of the site, but in places shown on plan brick walls will be constructed. The entrance will have massive plain piers, surmounted by electric light, and wrought-iron gates of suitable design.

The Estimates.

The estimates have been prepared with every care, and in considerable detail. Approximate quantities have been taken out by a well-known surveyor for one of the large pavilions, and for a bay of the corridor and subway. These quantities have been priced by a firm of contractors of high standing, and on their estimate the prices have been based.

In the pavilion bills, the sanitary tower, the large ward, and the south block were each kept separate. By means of the first of these accurate data exists for pricing all sanitary towers throughout, and by means of the other divisions for pricing all patients' buildings. Quantities were also taken out for drainage, paving of courts, roads and paths, walls, fencing, &c., lifts and services, heating, hot water supplies, electric lighting, telephones, fire-alarms, fire appliances, kitchen and scullery fittings, laundry fittings, engines and boilers, and estimates similarly obtained from builders and specialists.

The total cost of the whole hospital gives, on the basis of 500 patients' beds, a cost per bed of nearly 370*l.*, and having regard to the modern standard of a first-class fever hospital, it is submitted that this is moderate."

ST. GEORGE'S, WORCESTER.

THIS church is being built at the end of St. George's-square, Worcester, to replace a small and inconvenient church erected some fifty or sixty years ago. It will seat about 730 persons, and will cost about 7,500*l.* The total width is 60 ft., and the length 117 ft. The internal width of nave and chancel is 27·4 ft., and the height to ridge 51·0 ft. The materials used are red Stonehouse bricks and Bath stone, the roof being covered with Westmoreland slates. The decoration and some of the fittings will be executed as funds permit. The church will be lighted with electricity. Messrs. Thomas Collins & Godfrey are the builders, Mr. Birch acting as clerk of the works and Mr. Rumsey as foreman.

ASTON WEBB.

Correspondence.

To the Editor of THE BUILDER.

PROPOSED ROMAN CATHOLIC CATHEDRAL IN LONDON.

SIR,—It is proposed to erect a Roman Catholic cathedral as a memorial to the late Cardinal Wiseman and the late Cardinal Manning. The authorities secured a most suitable site for such a building during the lifetime of the late Cardinal Manning, and have now decided to erect a cathedral worthy of its name. To do this successfully it is most desirable to invite architects to compete for the proposed cathedral, and thus to secure the best and most suitable plan for such an important edifice. To arrive at an unprejudiced decision the jury should consist, say, of the heads of the principal academies of Europe—viz., Rome, Munich, Paris, Berlin, &c. ROMAN.

CROYLAND ABBEY.

SIR,—The writer of your short paper on Croyland Abbey seems to think that Canon Moore's plan was purely conjectural. In this he is mistaken. The position of both the Abbot's and the Monk's door could be seen in the remains of the old south aisle wall before it was destroyed in 1859. The Abbot's door was opposite the third bay, and the Monks' door opposite the eighth bay. Your writer also seems to think that the transepts had no western aisle. A few years ago, and for aught I know now, the weathering of the west aisle of the south transept could be seen on the remains of the south-west angle of the central tower. Though western aisles to transepts were not very common, the south transept of Peterborough Cathedral and the transepts of Spalding Parish Church (both near Croyland) show that they did sometimes exist.

Canon Moore's papers on Croyland were edited by the Rev. E. Manners Sanderson, and printed by Robert Appleby, of Spalding. They give a fairly full account of the Abbey, and are well worth reading. Unfortunately they do not say a word (for reasons which *some* people will understand) of his own great personal exertions to preserve the splendid west front of the nave from ruin.

J. H. GREEN.

VENTILATION FROM ABOVE OR BELOW.

SIR,—Having for many years watched the progress of this class of work as carried out in Canada and the United States, I think my information is fairly up to date in what has been accomplished. It has perhaps been the more interesting to me, as the greatest simplicity is shown in their endeavour to overcome this very difficult subject. That success lies with them in their system of floor ventilation is a fact, and for this reason I do not think it should be lightly passed over simply on the ground of the products from the burning of gas. We are told that the more deleterious elements descend to the floor as it is—in consequence of their greater specific gravity. The intensely-rarified air that hovers near the ceiling would be so diluted by the incoming fresh air that only an agreeable warmth would be apparent in its descent to the floor.

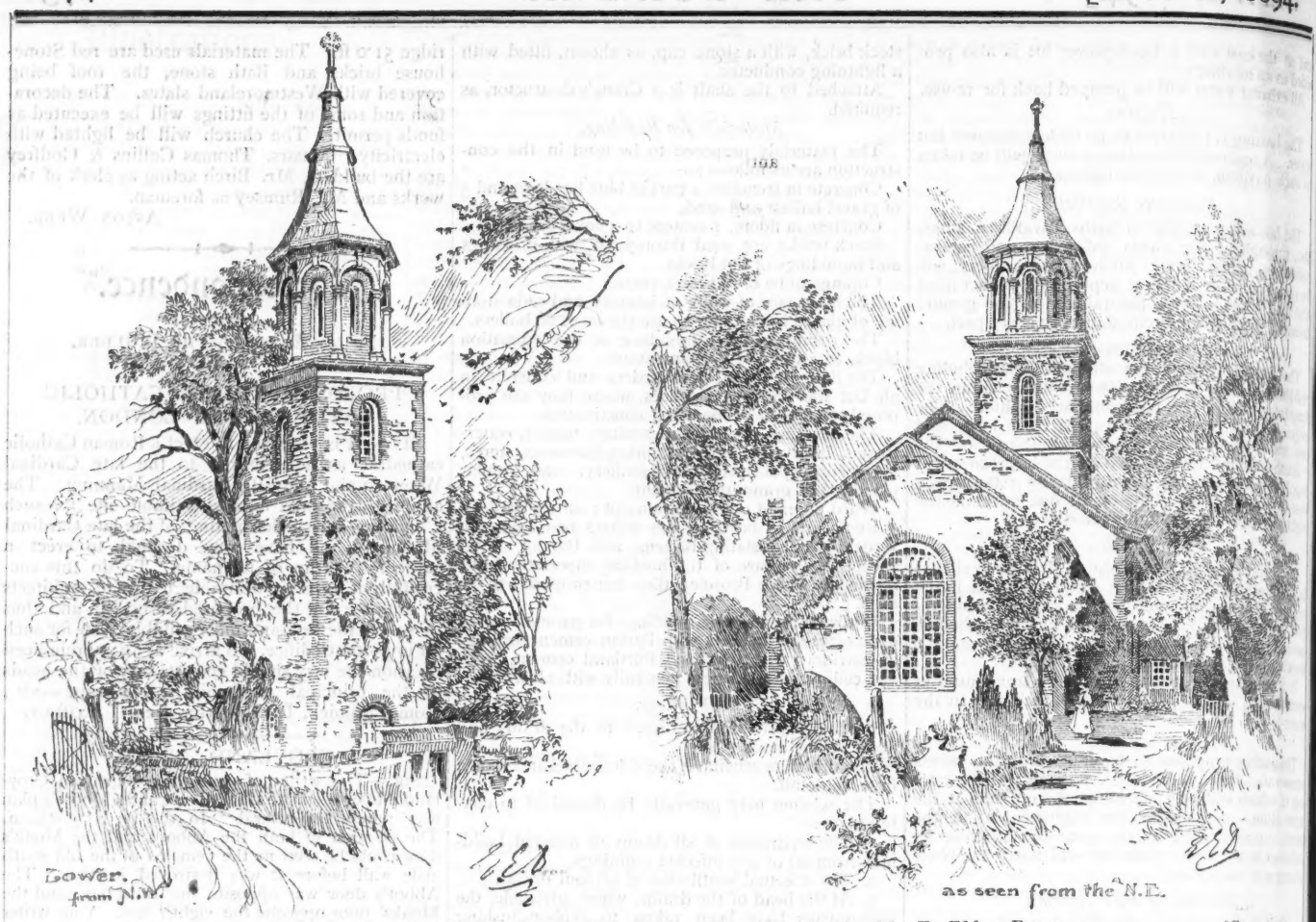
Again, many people are troubled with cold feet, and yet everything that the ingenuity of man can scheme goes to support and further, yea, to invite, the cold air currents along the floor. Is this in the wake of progress? I am inclined to say, go to the Chinese and learn of them.

I cannot help thinking if some of our eminent architects who are anxious to secure the best results for their clients would ask a few engineers for a scheme in competition they would stand a chance of seeing a better way than the present unsatisfactory one of attracting the foul air from *above*.

R. C.

BUILDING STONES AT THE ANTWERP EXHIBITION.

SIR,—In your capital article under this heading, reference is made to the frequent use in the Italian section of a soft white material that had undergone special preparation, in lieu of statuary marble, for statues, groups of figures, &c. This is, as the writer rightly assumes, a kind of gypsum, a white alabaster we know in the trade as Castillino marble. The "preparation" is particularly simple, and merely consists of boiling the figure or panel after it is closely roughed out. By this process all trans-



St. Paul's Church, Eastchester, New York. From Sketches by Mr. E. Eldon Deane.

parency is taken out of the stuff, and it becomes a dead white. Everyday-sort-of-things get fine names sometimes, as the following will illustrate:—At Chicago, last year, models of a determined-looking female, wearing a breastplate with the words "I WILL," upon it, were sold in that city at a rather long price. Examining one of these one day I remarked upon the great cost, and added "Why, they are only plaster of Paris casts." In reply, after the fashion of his class in that city, the man contradicted me bluntly, and said "They're made of a *preparation of Alabaster!*"

HARRY HEMS.

ST. PAUL'S CHURCH, EASTCHESTER, NEW YORK.

THIS little church was erected in the year A.D. 1765, by a tax levied upon Churchmen and Dissenters alike, then becoming, under the principles of common law, the property of the Church established by law, *i.e.*, the Anglican. It is not pleasant to reflect that its first Encumbent not only claimed the building, but tried to keep the Dissenters out after they had been taxed towards its erection. The stone spire was built a few years ago, following the lines of the original wooden one. The Communion plate (flagon, four chalices and paten) dates from 1829.

E. E. D.

The Student's Column.

DETAILS OF RURAL WATER SUPPLY.—X.

MEASUREMENT AND ESTIMATION OF THE FLOW OF WATER.

THE units of measurement usually adopted in gauging the flow of water are the cubic foot and gallon for capacity, and a minute, second, or twenty-four hours for time.

An imperial gallon of water at a temperature of 62 deg. Fahr., and a barometric pressure of thirty inches, weighs 10 lbs.; and a cubic foot contains 6·235 (practically 6¼) gallons.

The flow of water through sluices, pipes, or channels is governed by the same laws as falling bodies, and its motion would be uniformly accelerated but for the resistance offered by the friction and form of the channel.

The theoretical velocity due to the force of gravitation, friction being neglected, is expressed by the formula,

$$v = \sqrt{2gh}.$$

Where v = velocity in feet per second.
" g = the force of gravitation, or the velocity acquired by a body falling through space under the influence of the attraction of the earth, in one second.
" h = the head, vertical distance through which the water has fallen, or difference in level of the two ends of the channel, in feet.

The numerical value of g varies slightly according to the altitude and the latitude. In England the value usually adopted is 32·2 ft. per second. The above formula may therefore be written,

$$v = 8{\cdot}025\sqrt{h}.$$

If to the natural head artificial pressure equivalent to h' ft. has been added, then

$$v = 8{\cdot}025\sqrt{h + h'}.$$

These formulæ require modification according to the particular form of orifice through which water is discharged.

Gauging by Means of an Orifice.

The discharge of water through an orifice is proportional to the area of the orifice and the mean velocity of discharge. Theoretically the discharge from an orifice should be equal to the product of the velocity of discharge and the area of the orifice. Experiment has shown, however, that the converging currents of water as they approach the aperture produce a contraction in the area of the issuing stream, varying in degree according to the form of the orifice. This is called the "vena contracta." A co-efficient, determined by experiment, has therefore to be applied in each case, so as to make allowance for this contraction.

The formula for discharge through an orifice may therefore be written,

$$Q = 8{\cdot}025\, c\, a\sqrt{h}.$$

Where Q = discharge in cubic ft. per second.
" a = area of orifice in square ft.
" h = head in ft., or the height of the surface of the water above the centre of the orifice.
" c = a co-efficient applicable to the particular form of orifice.

The following values for c are adapted from those given in Spon's Engineering Tables:—

Round or square orifices in a thin plate	·62
Sluice at end of a rectangular channel	·70
Short tubes (three diameters and under) with square edges	·81
Short tubes, when the tube projects into a reservoir or cistern	·71

The following table gives the results of experiments made by eminent observers upon circular orifices with sharp inner edges:—

Name.	Head.	Diameter of Orifice.	Co-efficient.
	Feet.	Inches.	
Abbé Bossut	0·6	1·0	0·649
Castel	2·7	1·2	0·620
Venturi	2·9	1·6	0·622
Rennie	1·0	1·0	0·633
Rennie	2·0	1·0	0·610
Eytelwein	2·4	1·0	0·618
Weisbach	2·0	1·2	0·624

Mr. Mair-Rumley, in his experiments at Messrs. Simpson & Co.'s works at Pimlico, recorded in the *Proceedings* of the Institution of Civil Engineers, found that the co-efficient of discharge was affected by the temperature of the water.

The discharge through a submerged orifice is calculated in exactly the same manner, except that the difference in level of the surface of the water on either side of the orifice is taken as the head.

Gauging by Means of Weirs.

For this purpose a sharp-edged weir, Figs. 14 and 15, gives the most satisfactory results. A still-

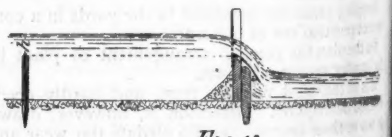


Fig. 14.

water pond should be formed on the up-stream side of the weir, to steady the flow of the water. A peg should be driven at a point in this pond as far as

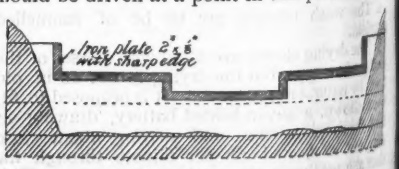


Fig. 15.

possible from the weir, and the upper surface of the peg should be made perfectly level with the upper edge of the weir. As it is difficult to drive a peg with precision under water, especially when the bottom of the pond is hard and stony, the following is a useful practice:—Drive the peg so that its upper surface is slightly below the

required level, and then drive a long flat-headed nail into the top of the peg. By means of a hammer the nail may be easily driven until its head is exactly level with the upper surface, or sill, of the weir. To construct a weir for the purpose of ascertaining the discharge of a stream of water, a water-tight dam must be formed, the best material for which is clay. In this dam the weir is fixed, which usually consists of a plank or frame of wood, with a rectangular notch cut in its upper edge. The plank is kept in a vertical position by means of stakes driven on either side of it. The horizontal edge of the notch, over which the water flows, must be fixed perfectly level, and must be bevelled so as to present a thin edge on the up-stream side. The depth of the water below the sill of the weir on the up-stream side should not be less than three times the depth of the water flowing over the weir; and the difference in level between the surface of the water on the down-stream side of the weir and the sill of the weir should not be less than half the maximum depth of the water flowing over the weir.

The theoretical formula for the discharge of water through rectangular notches is,

$$Q = \tfrac{2}{3} l \sqrt{(2g)}\, H^{\frac{3}{2}}:$$

where l = length of notch in feet.
H = height in feet of the free-level of the discharging water above the sill.
Q = discharge over weir in cubic feet per second.

Owing to the interference with the free flow of the stream occasioned by the ends and sill of the notch, a co-efficient, c, has to be applied to this equation, bringing it to the form—

$$Q = \tfrac{2}{3} c l \sqrt{(2g)}\, H^{\frac{3}{2}}.$$

The co-efficient c varies with l and H.

With values of H between ·25 and 2, and with l not less than 2, the co-efficient c is fairly constant, and may be taken as ·62, which is the same as that for the discharge of water through round or square orifices in a thin plate, given above.

In cases where extreme accuracy is not required, the following formula, proposed by the late Mr. Thomas Hawksley, F.R.S., may be employed :—

$$Q' = \frac{l h \sqrt{h}}{2}:$$

Where Q′ = discharge over weir in gallons per second.
„ h = depth of water flowing over weir in inches.
„ l = length of notch in feet.

The following table has been calculated from this formula :—

DISCHARGE IN GALLONS PER 24 HOURS FOR EACH FOOT IN WIDTH OF SILL.

Head of Water.	Decimals of an inch.										Head of Water.
Inches.	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9	Inches.
	gals.	gals.	gals.	gals.	gals.	gals.	gals.	gals.	gals.	gals.	
0	—	1,365	3,863	7,098	10,927	15,273	20,075	25,298	30,910	36,881	0
1	43,200	49,838	56,785	64,028	71,559	79,360	87,429	95,751	104,322	113,139	1
2	122,186	131,462	140,963	150,679	160,610	170,758	181,104	191,651	202,402	213,339	2
3	224,467	235,779	247,283	258,960	270,832	282,864	295,068	307,452	319,997	332,714	3
4	345,600	358,632	371,824	385,191	398,711	412,380	426,194	440,170	454,284	468,553	4
5	482,976	497,548	512,246	527,088	542,072	557,219	572,479	587,971	603,423	619,078	5
6	634,884	650,788	666,894	683,094	699,439	715,899	732,473	749,186	766,008	782,966	6

All measurements of depth should be taken at the peg above referred to, which should be situated at least 3 ft. above the weir. A thin steel rule should be used for this purpose.

Where, however, only the approximate discharge is required, the measurement may be taken over the sill of the weir. This method will obviously give a low discharge.

Gauging by Means of Uniform Channels.

The calculation of the discharge by uniform channels, such as canals and bye-washes, is of great importance in waterworks engineering, and has received much attention.

At the commencement of this chapter it was stated that the flow of water through sluice-pipes or channels is governed by the same laws as falling bodies, and its motion would be uniformly accelerated but for the resistance offered by the friction and form of the channel. The principal part of the friction is proportional to the square of the velocity, and is nearly the same at all depths. The friction, however, varies according to the surface of the fluid exposed to the solid in contact therewith, in proportion to the whole quantity of fluid; that is, the friction for any given quantity of water is as the surface of the bottom and sides of a river directly, and as the whole quantity of water in the river inversely. Therefore, supposing the whole quantity of water to be spread on a horizontal surface equal to the bottom and sides, the friction is inversely as the height at which the river would then stand, which is called the Hydraulic Mean Depth (Eytelwein's Hydraulics). The Hydraulic Mean Depth may be simply stated as the sectional area of a stream divided by its wetted perimeter.

Perhaps the most generally useful formula is that devised by Eytelwein, and slightly modified by Beardmore :—

$$v = 55 \sqrt{h \times 2f}$$

Where v = velocity in feet per minute.
„ h = hydraulic mean depth.
„ f = fall in feet per mile.

This formula must, however, be used with caution.

The following formula is given in Box's "Hydraulics" for long channels, neglecting head due to velocity of entry, which in long channels is inappreciable :—

$$C = \left(\frac{874520 \times F \times A}{L \times P}\right)^{\frac{1}{2}} \times A$$

Where L = length of channel in yards.
„ A = cross-sectional area of stream in square feet.
„ P = wetted perimeter.
„ F = fall in inches.
„ C = cubic feet discharged per minute.

Gauging by Means of Surface Velocity.

The discharge of a stream may be found by observing the surface velocity by means of a wooden float or weighted tube. The time occupied by the float in passing over a measured distance (which should be as great as possible) is noted, and the velocity reduced to lineal feet per second. As the surface velocity in the centre of a stream is greater than the mean velocity of the whole body of water, a proper allowance must be made.

The proportion which the mean velocity of the water in a stream of tolerably uniform section bears to the surface velocity at the centre has been made the subject of much investigation. The following formulæ, amongst others, have been proposed :—

U = Mean velocity in feet per second.
V = Surface velocity at centre in feet per second.

1.—Prony :—

$$U = \frac{V\,(V + 7{\cdot}783)}{V + 10{\cdot}345}$$

2.—Neville (for velocities less than 10 ft. per second, in small channels) :—

$$U = {\cdot}816\ V.$$

3.—Boileau (depth not exceeding 1 ft.) :—

$$U = {\cdot}785\ V \text{ to } {\cdot}865\ V.$$

4.—Beardmore :—

$$U = (V + 2{\cdot}5) - \sqrt{5}\ V.$$

The discharge is found by multiplying the mean sectional area by the mean velocity of the stream.

On a large scale an instrument called a *current-meter* is frequently used to determine the velocity, and hence the discharge of a stream.

The results arrived at by the above methods are only to be adopted when more reliable data cannot be obtained.

Very small streams may be gauged by allowing the water to flow into a vessel of known capacity (*e.g.*, a *pail* or *cistern*), and noting the time taken in filling.

Memoranda.

Cubic ft. per minute × 9,000 = gals. per 24 hours.
Gallons × ·1,604 = cubic ft.
Cubic ft. × 6·25 = gallons.

GENERAL BUILDING NEWS.

ADDITIONS TO BERWICK CHURCH, SHREWSBURY.—This church, which stands in Berwick Park, has been built at different periods, the older portions of the nave dating back probably to the sixteenth century. Until recently it consisted of a nave, tower, and porch. The tower was built about the year 1672 by Sir Samuel Jones, who endowed the church and built and endowed the adjoining almshouses and hospitals. The church has recently been enlarged by Mr. James Watson (for many years M.P. for Shrewsbury) by the erection of a new chancel, south chancel aisle, organ-chamber, clergy and choir vestries and north and south porches, which were consecrated by the Bishop of Lichfield on the 28th ult. The buildings are of Grinsill stone, in the Classical style of the buildings of the seventeenth century. The semi-circular chancel arch is the full height of the nave, so as to afford an uninterrupted view of the east end. There are four mullioned windows lighting the chancel and organ-chamber. The ceilings are semi-circular vaults panelled with moulded ribs. The east window has been filled with stained glass by Messrs. Comere & Capronnier, of Brussels, representing "Christ Blessing Little Children." The other windows are in geometrical patterns by Messrs. Camm, Bros., of Smethwick. The seventeenth-century wrought-iron altar railing has been restored and refixed. The chancel is paved with encaustic tiles from Messrs. Godwin's Lugwardine Tileries, Hereford. The south chancel aisle contains oak seats for the inmates of the adjoining almshouses. The ancient oak pulpit has been restored and refixed. The oak choir seats, prayer-desk, and eagle lectern have been made by Messrs. Jones & Willis, from designs prepared by the architect. The two-manual organ has been erected by Messrs. Walker & Sons, of London. The whole of the walls of nave and chancel, from floor to ceiling, have been panelled in oak with carved cornices, the east end having emblematical carvings by Mr. T. Catley, of London. The hot-water heating, gas-fittings, and ironwork, are by Lea, Sons & Co. of Shrewsbury. The whole of the works have been carried out from the designs and under the superintendence of Mr. F. B. Osborn, architect, of Birmingham, the contractors being Messrs. W. Bowdler & Sons, of Shrewsbury, Mr. James Thorneloe having been clerk of the works.

BUILDINGS EXTENSION SCHEME, UNIVERSITY OF ABERDEEN.—The executive committee has issued a further appeal for additional funds to complete this scheme. The University Court has contracted for building at Marischal College an east wing, accommodating the Mitchell Graduation and Examination Hall, Students' Union, and Anatomical Department; a north wing, accommodating chemistry, pathology, surgery, and botany; and heightening the central tower; and at King's College a new pavilion, containing gymnasium, refreshment-rooms, and attendant's house, besides separate accommodation for lady students. These buildings are now in progress, part of the east wing being roofed, and the central tower already forming a prominent feature in the view from high-lying parts of the city. The further buildings contemplated at Marischal College consist of a front block to Broad-street, accommodating administrative offices, law, practice of medicine, agriculture, and other departments, and a south wing accommodating the natural philosophy department. The Town Council of Aberdeen has undertaken to rebuild Greyfriars Church, an ancient edifice, formerly the college kirk, now a *quoad sacra* parish church, the present site of which will be absorbed by the extension—the new church costing at least 6,000*l*. The Town Council has also handed over to the University Court, free of cost, the Old Water House in Broad-street, valued at 800*l*., and has purchased, at a cost of 3,350*l*., the property at the corner of Broad-street and Queen-street, with the view of taking down the buildings and completing the improvement. Mr. A. Marshall Mackenzie, A.R.S.A., Aberdeen, is architect. It may be of interest to mention that the old buildings in Broad-street to be removed to make way for the extension include the house where Lord Byron lived for a time while a schoolboy in Aberdeen.

WICKER GOODS STATION, SHEFFIELD.—The Midland Railway Company's Wicker Goods Station has just been reopened, after alterations, which have been going on there since June, 1892. The new offices have a frontage to Savile-street. They cover an area of about 650 square yards, are erected of red brick, relieved with terra-cotta, and consist of three separate floors. On the ground-floor is the general correspondence office and offices for the cashier, staff clerks, store-rooms, &c. On the second floor are offices for officials, and on the third floor are similar offices. The offices will be lighted throughout with electric light, and for general working convenience are connected by a balcony and bridge with the goods warehouse and by spiral staircases with the platforms on the ground-floor and the stock warehouse above. The new warehouse consists of basement, ground floor, and upper floor. The basement is used for the storage of wines and spirits under bond, and ale in casks, and has a storage area of 5,500 square yards. The ground floor and upper floor are each of the same dimensions, and they are fitted with hydraulic cranes, lifts, capstans, and traverse tables. In the two floors there is a total area available for general storage of about 8,200

square yards. In the construction of these buildings a large amount of ironwork has been used, all of which is of English make. The space between the offices and the warehouse, as well as at either end, is covered with a glass awning, measuring some 4,100 square yards. The floor is laid with wood. The goods-yard has been entirely remodelled, and on the Spital Hill side of the yard an engine-house has been erected, in which are placed the engines, boilers, dynamos, &c., for working the hydraulic appliances and the electric light. The electric light installation consists of three single cylinder horizontal engines, by Marshall & Sons, Gainsbro', two indicating 80 horse-power each, and one 30 horse-power, four 35-light arc dynamos of the Thompson-Houston pattern, and one incandescent dynamo for 300 16 candle-power lamps, by Mathen & Platt. The incandescent lamps are for the offices, and in the Wicker warehouses and yard, and the engine-shed, Cardigan and Grimesthorpe sidings, there will be upwards of 110 arc lamps, each of 2,000 candle-power. The general contractors are Messrs. G. Longden & Sons, Neepsend, and sub-contracts were issued to the following firms:—For ironwork, of which some 2,000 tons have been used in the construction of the new warehouse, all of English make: Messrs. Eastwood, Swingler, & Co., Derby. Hydraulic cranes and hoists: Messrs. Armstrong, Mitchell, & Co., Newcastle-on-Tyne. Hydraulic capstans, &c.: Messrs. Tannett, Walker, & Co., Leeds. Painting: Messrs. Bagnall & Co., Shipley, Yorkshire. Plumbing: Messrs. J. B. Corrie & Sons, Sheffield. The company's architect, Mr. C. Trubshaw, has had control of the new work, and he has been assisted by Mr. G. E. Hardy, as clerk of works. Mr. S. W. Johnson, the company's principal engineer, has superintended the erection of the hydraulic machinery. Mr. W. Langdon, the company's electrical engineer, is responsible for the electric light installation.

RESTORATION OF SWINFORD CHURCH.—The restoration of Swinford Church, near Rugby, has commenced under the superintendence of Mr. H. M. Townsend, Diocesan Architect, Peterborough, who has also prepared the plans. The work includes the erection of a new chancel with apsidal terminations. It is proposed to re-floor and re-seat the nave, and to remove the western gallery. The east end of the church will be raised by seven steps in the nave, and provision is made for an organ-chamber and vestry, approached by arches from each side of the chancel. The above work forms part of a scheme for the restoration of the church, the cost of that at present taken in hand being estimated at 1,000*l.* The contractor is Mr. H. K. Franklin, of Deddington.

CO-OPERATIVE STORES, LEEDS.—On the 1st inst., extensions to the Co-operative Stores were opened at Leeds. The extension, of which Mr. Walter S. Braithwaite, of Leeds, is the architect, stands on the west side of Albion-street, to which it has a frontage of 80 ft., with a depth extending to Upper Mill Hill of 104 ft. It covers an area of 1,000 yards. For the most part it is to be devoted to the drapery and furniture business. The ground floor is to be given up to the furnishing department, with the exception of two front windows on the north side of the entrance. The floor is reached by the large central entrance, and purchasers may go from one department to another without coming outside. The first floor forms the drapery and millinery department. The second floor is to be devoted to workrooms for dress and mantle making. The third floor is the tailors' workroom. The basement has been given up to the furnishing department. The building is lighted throughout by electricity. Under the basement are the boiler-house, air-trunks, and receivers. The elevation to Albion-street is of stone from the Halifax district, that to Upper Mill Hill of pressed brick, and the rest of glazed brick. The floors are supported by iron columns, with English steel and iron beams and girders, and each is, as far as practicable, fireproof. The flooring is of wood blocks, and the ceilings, which are lofty, are panelled in concrete. The total cost will be about 17,000*l.* The contractors are—Mr. C. Myers, stone and brick work; Messrs. Bagshaw & Sons, Batley, iron roofs, girders, and columns; Messrs. A. & J. Wheater, concrete fireproof flooring; Mr. Thos. Moore, plasterers' work; Messrs. Watson & Worsnop, slaters; the society's own workmen, who, under the direction of Mr. Philemon Rump, the clerk of works, have done the carpenters' and joiners' work, and the plumbing, painting, and glazing; Mr. Edwin Oldroyd, the ventilating and warming appliances; Messrs. Tannett, Walker, & Co. have constructed the hydraulic hoist by which goods will be conveyed to and from the several floors; and Mr. J. A. Edmandson, the electric lighting.

SANITARY AND ENGINEERING NEWS.

THE HERMITE SYSTEM OF SEWAGE PURIFICATION.—The United States Consul at Havre, in a recent report on "Electrical Sanitation," observes: The report of a scientific and technical commission, composed of eminent chemists, engineers, and sanitarians, appointed by the Municipal Council of Havre to investigate the Hermite system, states that after prolonged experiments on an elaborate scale carried out thereon in the quarter St. Français, the results show that while the system gave excellent results from a sanitary standpoint, it cannot be considered an economical system, but requires further study and improvement before it can be recommended as applicable to large cities and towns. The conclusions of the commission in detail are: Electrolysed sea water is a powerful antiseptic and germicide. The activity of the agent is in proportion to the quantity by weight of chlorine used. The disinfecting action of the liquid is not instantaneous, but continues as long as there is an excess of chlorine remaining—that 77⅓ grains of active chlorine will, with sufficient time, completely disinfect the excreta of a normal "stool" or dejection, and after two hours of contact all pathogenic germs will be destroyed and disappear. The commission considers Mr. Hermite's process of sanitation by electrolysed sea-water under the following conditions to be of great value:—To act efficiently on the material to be disinfected the electrolysed water must be sufficient in quantity, and contain at least 4⅓ grains of free chlorine per pint. The excreta must be kept in contact with the liquid in the syphon of the closet or other receptacle a sufficient length of time to ensure the antiseptic action of the liquid before being discharged into the drain or sewer. Some doubt is expressed as to whether a chlorine liquid of the kind can be applied freely to dwellings without producing disagreeable, if not unwholesome, effects, and without destructive corrosion of metal pipes. It is believed that the chlorine gas will pervade the house to a greater or lesser extent, imparting its disagreeable odour to articles of food it may come in contact with, and irritating the lungs of the occupants.

SEWAGE SCHEMES, GLASGOW.—At a meeting of the Sewage Committee of Glasgow Police Commissioners on Monday, approval was given to a scheme prepared by Mr. M'Donald, the City Engineer, for the erection of sewage purification works at Dalmuir, similar to those at Dalmarnock, for dealing with that part of the sewage of the city on the north bank of the Clyde not touched by the east-end works. The scheme proposes that the greater part of the drainage area to be dealt with, covering 4,500 acres, shall be carried in a gravitation sewer, without pumping, to the Corporation lands at Dalmuir and there purified; and it is also proposed that the lower levels of Glasgow and Partick, extending within the city boundary to 800 acres, be pumped into an outfall sewer at a station on the Kelvin. An estimate of the cost will be prepared.

SEWAGE TREATMENT IN UPPER AIREDALE.—Mr. Frederick Herbert Tulloch, M.Inst.C.E., of the Local Government Board, held an inquiry on the 31st ult. at the School Board, Eastburn, in connexion with the application of the Keighley Rural Sanitary Authority for power to borrow money for sewerage and sewage disposal at the villages of Sutton, Sutton Mill, and Eastburn, and disposal works for the village of Steeton. Mr. R. B. Broster (engineer), of Messrs. Barber, Hopkinson, & Co., and members and other officials of the authority were present. It was explained that in Sutton, Sutton Mill, and Eastburn, with a total of 534 houses, the daily sewage from an estimated population of 2,670, was estimated at 80,100 gallons, and this it was proposed to treat on a four-acre site; the total cost of the undertaking being 6,476*l.* 9s. 3d. Steeton had already constructed a sewerage system, and a field had been purchased adjoining the Aire, the cost of the scheme being 1,546*l.* 15s. 9d. Both systems would be on the principle of intermittent downward filtration. It was proposed to allocate the expenditure as under:—Sutton proper, 5,400*l.*; Eastburn, 1,100*l.*; Steeton, 1,550; total, as applied for, 8,050*l.*

WATER SUPPLY, WYRE AND BISHAMPTON, WORCESTERSHIRE.—The Pershore Rural Sanitary Authority have instructed Mr. J. E. Willcox, C.E., of Birmingham, to prepare plans and specifications and obtain tenders for the works of water supply at Wyre and Bishampton.

SEWAGE DISPOSAL, PELSALL AND RUSHALL, STAFFORDSHIRE.—The Walsall Union Rural Sanitary Authority have called in Mr. J. E. Willcox, C.E., of Birmingham, to prepare schemes for the sewerage and sewage disposal of the districts of Pelsall and Rushall.

FOREIGN AND COLONIAL.

FRANCE.—M. Barthon, the Minister of Public Works, on his return from his visit to England, has informed the editor of *Le Temps* that he was at once astonished and jealous at the facilities of transport in England, and especially in London; and he is determined to press on the Chamber, as soon as it meets, the immediate commencement of the Paris metropolian railway, the construction of which, he says, presents no such difficulties as those of the London line. It is to be feared however that M. Barthon will find difficulties of another and semi-political kind opposed to the realisation of the scheme. A metropolitan railway would enable many Parisians to live outside the octroi barrier, to the diminishing of that important source of income to the municipality; and that fact alone is likely to be an important obstacle.——The works for the enlargement of the Ecole de Droit, Rue Soufflot and Rue St. Jacques, are being actively carried on, and it is expected the building will be completed by the end of the year.——There is talk of pulling down the Eden Theatre, and appropriating the site to a building for business purposes.——M. Maillard, the sculptor, has been commissioned by the Department of Fine Arts to execute a monument to Brantôme, to be erected in the little village of Bourdeilles.——It is announced that the prison of the Château at Amiens has been destroyed by fire.——The Conseil-Général of Vaucluse has recently passed a vote to demand from the Government the complete restoration of the Roman Theatre at Orange.——The towns of Eu, Mers, and Tréport have had an artesian well bored, at their joint expense, which is intended to furnish drinking water for the whole district in which these towns are situated, and which is so much frequented during the bathing season.——M. Metzer, Ingénieur-en-Chef des Ponts et Chaussées, has been appointed to the newly-created post of Inspector-General of Public Works in the Colonies.——The French Government has decided on the erection of a house for the French Embassy at Vienna. It is to be built by a French architect.——The jury of the International Exhibition at Antwerp has awarded Medals of Honour to M. Deglane and M. Loriot, architects, of France.

GERMANY.—The Emperor and Empress were present at the consecration of the sarcophagi of the Emperor William I. and his Consort in the mausoleum at Charlottenburg. The works are by Professor Encke, and are executed in Carrara marble.——The new Imperial Houses of Parliament at Berlin are to be completed by October 1, and overtime is being worked in order to have all ready by that date. Herr Wallot is now engaged on the designs for the laying out of the approaches.——The contract for the main building of the 1896 Industrial Exhibition is to be settled this year, so that building may be commenced early next spring.——The new tramway lines over the Linden are to be opened for traffic on the 15th.——The following gentlemen have been nominated members of the Berlin Academy of "Bauwesen": Messrs. Wichert, Reimann, Hinckeldeyn, Wolff, Wallot, von der Hude, Crämer, Haack and v. Beyer.——On the occasion of the opening of the new Imperial Houses of Parliament, Professor Wallot will receive the degree of Phil. Dr., *honoris causa*, from the University of Giessen.——The Government has granted travelling stipendia of 150*l.* each to five nominees of the Archæological Institute.——The designs sent in by the nine sculptors to whom the competition for the statuary for the Emperor William Memorial Church was limited, are now being considered by the National Art Commission.——On the occasion of the two-hundredth anniversary of the University of Halle, the Emperor has presented his portrait and a sum of 1,800*l.* to the Festival Committee. To commemorate the occasion the Province renovated the church of St. Mary Magdalene, on the Moritzburg, at a cost of 9,500*l.*, and the city gave a bust of Thomasius. A statue of the renowned surgeon, Richard Volkmann, was unveiled in the entrance to the Surgical Schools.——The Dresden Art Exhibition, which was recently opened by the King of Saxony, is held for the first time in the new building designed by the late Professor Lipsius. Eight hundred works of art are exhibited out of a total of 2,150 sent in. The Royal Galleries have lately acquired the Earl of Dudley's famous Murillo, "The Death of St. Clara."——The Provincial Diet of Gotha is about to purchase the Palace of Friedrichsthal from the Duke for 14,400*l.*——A fresco portrait of the Duke Frederick of Teck, hitherto painted out, has been discovered in the lower engine-room of the Small Arms Factory of Mauser, at Oberndorf. The room formerly served as the refectory of the Augustinian Monastery founded by the Dukes of Teck.——A monument to the poet Heinrich Laube is to be erected at Sprottau, his native town.——It is proposed to place all the relics collected during the *Limes* investigations in the German National Museum at Nuremberg.——Near Nidden, on the Kurische Nehrung (Baltic coast), traces have been discovered of dwellings dating from the Stone Age, by Herr Hollack, of the Prussia Museum. The finds are from 10 ft. to 12 ft. below the surface, and partly under water. They consist of rude stone implements for the most part, and, judging from the different strata superimposed, are supposed to date from about 3,000 years before the Christian era.——The sculptor, Mathias Vordermayer, principally known for his works in wood, has died at an early age. A figure of his, representing Domestic Industry as a maiden spinning, has attracted much favourable attention at this year's Berlin Art Exhibition.

RUSSIA.—The Ministry of Communications is considering a proposal to construct a direct waterway between the Baltic and the Black Sea, utilising the rivers Dwina and Dneiper on the way. The scheme, which would be of great strategical value as connecting the two fleets, includes the building of a harbour either at Chersson or Kachowka.——To commemorate the marriage of the Grand Duchess Xenia the Czar is establishing an educational institute for girls, and has given 400,000 roubles towards the rebuilding of the palace of the late Grand Duke Nikolai Nikolajewitch for this purpose.

BELGIUM.—Two Roman monoliths have been recently unearthed in the Medardus Church at Werwica, in West Flanders. The church dates from the fourteenth century, and occupies the place of a Roman temple mentioned by Cæsar as the Veroviacum.

DENMARK.—The contracts for the building of the Copenhagen Town Hall have been distributed. The cost of the main building will be 506,000 kr., and that of the annexe 374,000 kr. The greater part of the work is to be completed in 1895.——A new municipal church is to be built in Copenhagen at a cost of 85,000 kr.——The Administration of the Danish State Railways has decided to construct extensive new goods depôts in Copenhagen at a cost of 575,000 kr.——The construction of the great offices of administration and depôts of the "free harbour" in Copenhagen is now being carried on by a large staff of workmen from designs by Herr Dahlerup, architect and Councillor d'Etat.——One of the most important buildings added to modern Copenhagen, in recent times, is that containing the new premises of the Great Northern Telegraph Company, whose head offices are located in that city, and those of the Copenhagen Private Bank, each company occupying one-half of the building. The building has been constructed from Bremen sandstone, with *plaques* of fine red tiles, and columns of red granite from the island of Bornholm. The ornamentations are executed in calcined and glazed clay, harmonising with the tone of the sandstone. The building is crowned by a bronze statue of "Electra," holding a torch, whence the electric light will be flashed, modelled by the Norwegian sculptor Herr Stephan Sinding. The reliefs in the ceiling of the portal have been designed by Herr H. Brasen, and modelled by Herr H. Ch. Petersen, the sculptor, who executed the works in the Palace of Frederiksborg. The architect is Herr Blichfeldt.——The Danish Government has decided to construct new Customs Houses and free depôts in the city of Aarhus, the capital of Jutland. The cost is estimated at about 300,000 kr., and the structures will take three years to complete. The architect is Herr Kampman.——Several interesting ancient buildings are now in course of construction in Denmark. The old Helligaandskirke, or Church of the Holy Ghost, is being restored under the guidance of Professor Storck, the antiquarian architect, at a cost of 55,000 kr. The interior is to be restored in exact conformity with its appearance, &c., in the Middle Ages.——The Danish Minister of Culture and other authorities have visited Ribe Cathedral, the most important ecclesiastic edifice in Jutland, in order to make arrangements for its restoration, and improvement of the site.——In the town of Randers, Jutland, the ancient historical Helligaandshus, or House of the Holy Ghost, famous as a monastery and *hospitium* in the Middle Ages, is to be restored, and the market-square in its front enlarged and improved.——A historical museum has been established, after much labour, in the restored northern wing of the ruins of the old Castle of Koldinghus. It contains antiquities of much value.——The Danish Minister of Public Works has issued a circular calling upon all provincial authorities to assist in the preservation of ancient buildings, memorials, and remains, with antiquities found in the earth. There are now over 2,000 of the former in Denmark, all registered and preserved as Crown property.

NORWAY. — The Norwegian Association of Engineers and Architects has elected Herr Johan Roshann president for the ensuing year.——A business house erected by Herr Nissen, four stories in height, in the Bank Plads, is worthy of notice, as it has been painted with so-called "Munich colour," the building being the first in Christiania treated in this manner. It will be interesting to see how this colour will resist the rigid climate of Norway.——We referred recently to the project of erecting new premises for the Bank of Norway in Trondhjem, where its head-office is situated, and that only a limited number of architects was to compete for the designs and plans. It now appears that such is actually the case, and a well-known architect, Herr Henry Bucher, strongly protests in the *Morgenblad* against this course being followed with respect to a building of such national importance.——We also referred some time ago to a competition between Norwegian, Swedish, and Danish architects, for designs for a villa to be built on an island near Christiania for a Swedish operatic singer, which has attracted unusual notice in Scandinavian architectural circles. The jury consisted of three Stockholm architects, and they have awarded all the three premiums offered to Stockholm architects. The successful architect is Herr Folke Zettervall, Stockholm, who receives 800 kr.; the two other premiums were 400 kr. and 200 kr. There were received in all forty designs. These are now being exhibited in Christiania, and according to the *Teknisk Ugeblad* the Swedish architects show a decided English-American influence in their style, whereas the Norwegians have mainly drawn from the old Norse timber structures. By the side of these chief characteristics may be traced a German training with the architects of both nations.——A large municipal church has been completed in the town of Skien, the ornaments being executed in Norwegian marble. The architect is Herr Berg.——A new museum is being erected in the town of Stavanger under a State grant.——In Christiansand a new Governor's residence is to be built, at a cost of 55,000 kr. The first story will be executed in granite. The architect is Herr Fürst.——Herr Henr. Nissen has just completed designs and plans for a new Governor's residence in the Arctic province of Finmarken.——The Norwegian Society of Engineers and Architects is strongly advocating the establishment in Norway of a technical high college with State grant, and the leading journals are echoing the demand.——The Storthing has granted a sum of 38,000 kr. towards the restoration of the so-called "Munk's Church" in Stavanger and the Utstein Cloister Church, on the island of that name, two of the most interesting historical edifices in Norway. The plans for the restoration have been prepared by Herr Johan Meyer, architect, who will also carry out the work.

MISCELLANEOUS.

LONDON STREETS AND BUILDINGS BILL.—We are informed that the Bill promoted by the London County Council, the London Streets and Buildings Bill, has received the Royal Assent, and comes into force on January 1.

A BLACK SEA-BALTIC CANAL.—The Russian Minister of Communications is elaborating plans for the construction of a canal between the Black Sea and the Baltic through the rivers Dnjepr and the western Dwina. The preliminary surveys have already been commenced. First, a canal is to be constructed through the lower course of the Dnjepr; and, secondly, the river will have to be deepened where a port is to be constructed, for which is projected either of the two towns of Cherson or Kachowka. Part of the river Bug would also be included in the scheme.

LECTURES ON GOTHIC ARCHITECTURE AT NEWCASTLE.—In connexion with the University Extension, a course of lectures on "Gothic Architecture," by Mr. D. H. S. Cranage, M.A., has been arranged for at Newcastle-on-Tyne. The lectures, which will be delivered on Thursdays, will be given in the Theatre of the Literary and Philosophical Society, at eight p.m., preceded by a class at seven, and will commence on the 20th inst., and terminate on the 6th of December.

BRADFORD HISTORICAL AND ANTIQUARIAN SOCIETY.—Between fifty and sixty members of the Bradford Historical and Antiquarian Society journeyed to Malton on the 1st inst. They first visited St. Leonard's Church, and from thence they passed the site of the Roman encampment, and on to Old Malton. An inspection was made of the old Gilbertine church. Assembling later at the west front, near the Norman doorway, Mr. T. T. Empsell, chairman of the society, introduced Mr. C. H. Channon, of Malton, who, in the course of a paper, said the most interesting feature of Malton, both from its historical associations and architectural beauties, was the Priory Church. The present building was but the fragment of a once glorious minster, but in ecclesiastical history it stood alone as the only existing church in the country founded by a purely English Order in which public worship is still held. It was founded by Eustace Fitz-John for Gilbertine canons in 1150, only two years after the establishment of that Order. St. Gilbert of Sempringham, the founder of the Order, he said, did not enter his own Order till several years after its foundation, and when he did so received the habit from his friend Roger, Prior of Malton, whom he appointed to succeed him as Master of the Order. Roger's name, he pointed out, was in the capital of the fourth pier on the north side of the nave, with the inscription:—"Rogerus Pri. Orate p. bon. Fratri Cari." The name was inserted (it is supposed as a sign of humility), and it is accompanied by a rebus —a bolt through a tun. Some of the Priors represented Malton in Parliament in the reign of Edward I. Having referred to the chartulary of the priory now amongst the Cotton MSS. in the British Museum, Mr. Channon exhibited plans and sections, giving full details of the church as it was and as it is, together with the monastic buildings, of which nothing remains but the crypt under the adjoining house called the Abbey. He traced the subsequent history of the Priory Church, and concluded with a reference to the recent restoration. After leaving the church the party proceeded to the crypt. The old Lodge at Malton was also visited.

FAIR WAGES AND THE LEEDS CORPORATION.—In May last the Leeds City Council ordered the report of a special committee upon wages and the subletting of contracts to be sent back to that body, in order that it might take into consideration the representations of employers and employed, with respect to what was set forth in the document. Since then the committee has had interviews with representatives of the Conciliation Board, the Chamber of Commerce, the Master Builders' Association, the Coal-masters' Association, and the Trades and Labour Council, with whom the proposals contained in the report have been discussed. The result is that the committee has decided to recommend certain alterations to be made. These are to be found amongst the stipulations to be imposed upon contractors. "In No. 1 the words within parenthesis are struck out. The contractor shall pay all workmen employed by him (in or about the execution of this contract on any part thereof) wages, and wages for overtime respectively, at rates not less than the standard rate of wages in each branch of trade recognised in the district where the work or any part of it may be done." Nos. 2 and 3 will read as follows:—(2) "The contractor shall observe and cause to be observed by such workmen hours of labour not greater than the hours of labour—and also the conditions of labour—usually observed in such district, other than any condition that Union men only shall be employed." (3) "The foregoing conditions shall not apply to any trade or trades during the existence of a general lock-out in such trade or trades. The corporation shall be the sole judges as to whether such a general lock-out exists. Then No. 5 has been altered to read:—"The contractor shall, to the satisfaction of the Council, provide and keep proper books, in which shall be correctly and promptly entered from time to time the names of, and the wages paid to, and the hours of labour observed by, all workmen employed by him, and shall from time to time, when required, if the Corporation conclude they have reasonable grounds for believing that the above conditions are not being complied with, produce such books to the Town Clerk or Deputy Town Clerk, to inspect the same, and allow him to take copies of, or extracts from, such books, or any of them."—*Leeds Mercury.*

OAK DOORS FOR THE GUILDHALL.—A pair of oak doors have just been added to the main entrance of the Guildhall, at a cost of 200 guineas. They have been designed by Mr. A. Murray, the City Surveyor, in the fifteenth-century style.

THE DWELLINGS OF THE POOR.—The monthly meeting of the Mansion-house Council on the Dwellings of the Poor (of which the Lord Mayor is president), was held on Tuesday, Mr. John Hamer in the chair. The secretary read the report of the work, which showed that a special reinspection had been made of 319 houses in the Battersea district, where the number of defects had been reduced from 1,022 in the first instance to 417. Insanitary conditions had also been dealt with in Hackney, Islington, Bethnal-green, Shoreditch, Camberwell, Mile-end, Whitechapel, Poplar, Hampstead, Marylebone, Newington, St. George-the-Martyr, Hammersmith, Wandsworth, Westminster, Strand, Clerkenwell, West Ham, Limehouse, Chelsea, St. Luke's, Lewisham, St. George's East, Rotherhithe, and the City. A closing order had been applied for in the case of twenty-two cottages comprising Jerusalem-gardens, Hackney, which were found to be in a very bad condition, most of the closets having no water supply. The London Health Laws compiled for the Council had been published and sent to the Press.

THE READING-ROOM OF THE BRITISH MUESUM.—Mr. J. Munroe, C.E., writes to the *Times*:—"Now that the Reading-room of the British Museum is closed for cleaning and repairs, I would, with your permission, call attention to the very bad air and insufficient ventilation of this public institution, both for the sake of the staff and the readers. Every other convenience has been provided there, good light, easy chairs, and so on; but good air, which is so essential to the health, especially of the brain-worker, and consequently to the value of his work, is denied. Many complaints are made of headaches and other effects of bad air amongst the readers, but students are proverbially negligent of such matters, and the evil is allowed to go on. The air is always heavy and foul in the reading-room, especially in the afternoon, but it is worse on some days than others. The ventilation is defective, and should be improved as soon as possible. This might be done at a trifling cost by means of air propellers. There should be a constant renewal of the air in the room."

LEGAL.

SCALES AND CAIN *v.* TREASURE & SON.

AT the Clerkenwell Police-court on the 30th ult. J. Scales, a bricklayer, and T. Cain, a labourer, summoned Messrs. Treasure & Son, the contractors for St. Mark's Hospital, City-road, for 9½d. and 6½d. respectively, in consequence of not being paid their wages at the expiration of one hour's notice of their intention to leave work. Messrs. Treasure's case was that there were between forty and fifty men on the works, of whom eleven bricklayers and seven labourers gave notice at 4 p.m. on August 22 of their intention to leave at 5 o'clock. At 5 o'clock they demanded their wages, but the foreman, not having sufficient money, told them that, under the rules agreed upon by the employers and workmen, if more than 10 per cent. of the men employed on any job give notice to leave they are not entitled to receive their wages till the following Saturday at noon, but if they liked to call the next morning, Thursday, at 7 a.m., he would have their money ready. On presenting themselves they were paid their wages in full up to 5 p.m. on August 22, but demanded one hour's pay for attending. This was refused, hence the present proceedings. The magistrate dismissed the summons in each case.

CAPITAL AND LABOUR.

LOCK-OUT IN THE BOLTON BUILDING TRADE.—An attempt to settle the dispute resulting in

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*School, Brougham-terrace	West Hartlepool School Board	.....	Oct. 31
*Museum for Antiquities, Cairo	Egyptian Government	First 600*l.* and 400*l.* between the next four	Mar. 1, '95

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered
Wesleyan Chapel and School, South Moor, co. Durham	M. H. Kellett	.....	Sept. 11
Cast-iron Pipes and Castings (13,000 tons)	Swansea Town Council	*Official*	do.
*Kerbing, Tarpaving, Metalling, &c. Work	Lewisham Bd. of Wks.	do.	do.
Quay Wall (376 yds.)	Ayr Harbour Trustees	H. V. Eaglesham	Sept. 12
Sewers, Oswald and other Streets	Rochdale Corporation	S. S. Platt	do.
Additions to Hospital, Northallerton	.....	C. Hodgson Fowler	Sept. 13
*Heating Apparatus, S. E. Hospital	Met. Asylums Board.	*Official*	do.
*Digging Graves, Building Brick Graves, &c.	Putney Burial Board	do.	Sept. 14
Levelling, Paving, &c. Back Christ Church-street, &c.	Preston (Lancs.) Corp.	do.	do.
Sanitary Offices, Montrose-street, &c.	Glasgow Police Com.	do.	do.
Police Station, Turton, near Bolton	Lancs. County Council	H. Littler & Son	do.
Additions to Schools, Hassocks, Sussex	Clayton and Keymer (U.D.) School Board	A. Loader	Sept. 15
Gas Mains	Brighouse (Yorks) Crp.	J. Parkinson	Sept. 17
Laying Cast-iron Gas Mains	do.	do.	do.
Hotel, Old Toll Bar, Meanwood-road, Leeds	Saml. Scurrah	Thos. Winn	do.
Hotel, Cardigan Arms, Kirkstall-road, Leeds	Benj. Greaves	do.	do.
Works at Union Offices	Preston (Lancs.) Union	Wm. Rawcliffe	do.
Sewage Works, Londridge, near Preston	Longridge Local Board	T. S. M'Callum	do.
Additions to Police Station, Disley, Chester	.....	Stanhope Bull	do.
Kitchen and School Class-room, near Midland-road	Walsall School Board	Bailey & McConnal	do.
*Supply of Stores	London Tilbury and Southend Railway	*Official*	do.
Hospital, Vauxhall-lane	Southborough Loc. Bd.	W Harmer	Sept. 18
Additions to Schools, Argyle-street	Ipswich School Board	F. E. Bisshopp	do.
*Oats, Hay, Clover, and Straw	Tottenham Loc. Bd.	*Official*	do.
*Erection of Public Library	do.	P. E. Murphy	do.
*Making-up and Paving Roads	Fulham Vestry	C. Botterill	Sept. 19

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Extension of Sewer, Lowick-green	Ulverston U.R.S.A.	J. Greenwood	Sept. 19
*Paving Works, &c.	Greenwich Bd. of Wks.	*Official*	do.
*New Casual Wards	St. Georges-in-the-East Parish	Wilson, Son, & Aldwinckle	Sept. 21
*New Schools	Saxmundham Sch. Bd.	*Official*	do.
Police Station Works, Goodall-street	Walsall Corporation	do.	Sept. 22
*Constructing Reservoir	Cromer Water Works Co. Ltd.	J. C. Mellias	do.
Schools, Lee Mount	Halifax Sch. Bd.	J. F. Walsh	do.
School Extension, Tirphil, S. Wales	Galligaer Sch. Bd.	J. Williams	do.
School Buildings, &c.	South Normanton Sch. Board	J. T. Shardlow	Sept. 24
*Low Level Sewerage Works	Hendon Local Board	S. S. Grimley	do.
Two Wool Warehouses, Square-road, Halifax	.....	R. Berry	Sept. 27
*Refuse Destructor, Buildings, &c.	Brighton Town Council	F. J. C. May	Sept. 28
*Fire Escape Staircases, Dartford	Met. Asylums Board	A. & C. Harston	Oct. 1
*New School Rooms	Seaford School Board	*Official*	Oct. 3
*Sewerage Works, Floodgates, &c.	Melton Mowbray Local Board	do.	No date
Reservoir	Redruth Local Board	do.	do.
*Re-building and Fitting Establishment	St. Marylebone P. B. & W. Commrs.	do.	do.
Schools, Ellesmere and Criffins, Salop	.....	A. E. L. Oswell	do.
Street Works, Long Eaton, Notts	Working Men's Co-op. Society	E. R. Ridgway	do.
Buildings at Central Station, Vastern-road	Reading Electric Supply Co. Ltd.	Fred. W. Albury	do.
Additions to "Fairfield," Pontypridd	T. R. Hamlen-Williams	T. R. Phillips	do.
*Cottages in South London	.....	E. Tompkins	do.
Extension of Premises, Fernhill	Bury (Lancs.) Commercial Co. Ltd.	J. H. Wood	do.
House, Attercliffe, Chesterfield	.....	W. H. Wagstaffe	do.
Model Lodging-house, King-street, Chorley, Lancs.	Jno Greenwood	.....	do.
*Schools at Corsham	Corsham Sch. Bd.	H. Brakspear	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Draughtsman (Admiralty Outposts)	Civil Service Com.	.....	Sept. 11
*Assistants (2), in Woodwork, &c.	Sch. Bd. for London	120*l.* each	Sept. 24
*Surveyor	Brentford Loc. Bd.	200*l.* &c.	do.

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv., vi., *and* viii. *Public Appointments, pp.* xviii. *and* xx.

strike of the Bolton stonemasons five weeks ago, and also that among a section of Bolton plumbers, having failed, the employers on August 31 resolved to lock out on the next day the whole of the operatives in the building trades—numbering over 1,000—until several disputed questions are either settled or referred to the Conciliation Board. The employers say that the result of the operatives' action will be a general introduction of machinery and a reduction in the number of men.

PLASTERERS' STRIKE, PAISLEY.—The plasterers employed in Paisley came out on strike on Monday. The rate of wages presently paid the plasterers is 8d. per hour, and the demand put forward by the men is that this should be increased to 8½d., with an increase of an additional ½d. at March next. The masters have refused to concede this demand, and they state that, according to an arrangement made last March, the present rate of wages was to continue in force till March of next year. The building trade is unusually busy in Paisley.

MEETINGS.

SATURDAY, SEPTEMBER 8.

Northern Architectural Association.—Excursion Meeting at Axwell Park.

MONDAY, SEPTEMBER 10.

Clerks of Works' Association (Carpenter's Hall).—Monthly Meeting, 8.0 p.m.

TUESDAY, SEPTEMBER 11.

Glasgow Architectural Association.—Visit to Conservative Club, Bothwell-street, 5.15 p.m.

SATURDAY, SEPTEMBER 15.

Architectural Association.—Fifth Summer Visit, Kettering and Rushton Hall, Northants.

London and Provincial Builders' Foremen's Association (Memorial Hall, Farringdon-road, E.C.).—Monthly Meeting, 7.0 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

16,194.—T-SQUARES: *J. P. Maginnis.*—This patent consists of an attachment to an ordinary T-square in the form of a flat bar of wood with a working edge made truly and perfectly straight. This bar is of such a form that it may be placed between the head of any ordinary T-square and the working-edge of the drawing-board, and is fastened or adjusted by slots and suitable bolts or screws.

18,075.—FLOORS, STAIR-TREADS, AND PAVEMENTS: *D. Wilson.*—According to this patent pieces of wood are inserted in floors, stair-treads, &c., at suitable distances apart, so that portions of the surfaces of the said pieces when they are in place are flush with or about on the same level as the surfaces of the pavement, &c. The pieces of wood are fixed so that the grain of the wood is at right-angles, or nearly right-angles, to the surface of the pavement.

22,146.—TILES, MOULDINGS, &c.: *J. A. Eason.*—This patent relates to improvements in machinery for the manufacture of tiles "made in dust," consisting chiefly in the use of an indiarubber moulding or die which, after being compressed by stamping, rights itself and lifts the moulding off the bottom die.

7,637.—RAINWATER-PIPES: *W. Macfarlane.* — The object of this invention is to provide means for any length of pipe in a "stalk" of pipes to be removed and replaced with great facility and without disturbing the others; and also a device whereby any matter which enters the pipes and obstructs them is intercepted and may be removed. By means of a faucet, spigot, and a grating these are accomplished.

11,791.—ROOFING-TILES: *F. M. Daihoff* (Borghorst).—A lipped roofing-tile in which the lips are arranged in such a way as to enable the roofing to be done in a perfectly air-tight manner, rendering special fastening devices unnecessary.

12,468.—TOOLS (Braces, Bit-stocks, &c.): *A. Brehm* (Berlin).—A bit-holding device for braces, &c., enabling a ready and secure clamping of the bit to be effected, preventing it from slipping out of the socket when the motion of the brace is reversed for withdrawal.

NEW APPLICATIONS FOR LETTERS PATENT.

AUGUST 20.—15,800, J. Clayton, Waste Water-closet Hopper and Basins, and Waste Water Flushing Apparatus.—15,811, F. Jacks, Back Draught Preventing Chimney-top and Ventilator.—15,834, H. Wood, Manufacture of Bricks.—15,840, W. Garland and W. Shears, Raising, Lowering, and Securing Window-sashes.—15,845, W. White, Swing Gates.—15,854, A. Slater, Machinery for Painting.

AUGUST 21.—15,863, W. Stead, Combined Grating Box and Door Trap for Sewers, Gullies, &c.—15,875, L. Walker, Fixing Wood Paving and Flooring to Concrete or other Foundation, and for obtaining greater Surface Wear.—15,936, C. Parsons, Window Fasteners.—15,944, J. and B. Craven, Machines for Pressing Bricks, Tiles, &c.

AUGUST 22.—15,982, D. Williams, Paint.—16,010, C. Polden, Window-sash Fastener.

AUGUST 23.—16,021, C. Buchanan and J. Barr, Pivot Sash and Case Window.—16,031, J. Sinclair, Window-sashes.—16,051, G. Bullock, Disinfecting Ventilator for Public Buildings, &c.

AUGUST 24.—16,109, E. Sheldrick, Window-sash.—16,125, J. Earnshaw, Chimney Flue for Cottages and other Buildings.—16,152, E. Hughes, Firepoof-floor and Ceiling Constructions.—16,176, A. Slater, Rebating and Chamfering Machines.—16,179, B. Dallyn, Sash Fasteners.—16,181, S. Gurd, Sash Fasteners.—16,182, D. Moody, Fastenings for Windows, Cupboards, Doors, &c.—16,183, T. Holmes, Sash Fasteners.—16,184.—H. Tucker, Window-sash Fasteners.—16,185, W. Yates, Sash Fasteners.—16,219, J. Couddas, Securing Sheets of Corrugated Iron to Buildings.—16,245, G. Vogt, Chimney-top Mounting.—16,250, J. Bond, Brick-making Machines, &c.—16,251, J. Bond, Hinges for Gates, &c.—16,261, W. Hemmings, Sash Fastener.—16,266, W. Carter, Window-sash Fasteners.—16,268, E. Blunden, Window-sash Fastener.

PROVISIONAL SPECIFICATIONS ACCEPTED.

12,919, J. Williams, Boring, Tunnelling, and Excavation of Earth, and to apparatus therefor.—13,116, J. Gordon, Making Glazed Bricks, Tiles, &c.—13,181.—G. Brindley and others, Syphon, Cisterns and Water Waste Preventers.—13,804, T. Robinson, Pipe Joints.—13,814, W. Wilkinson and H. Alexander, Brick and Tile Presses.—12,244, B. Von Possanner Ehrenthal, Plumbing Seals.—14,688, J. and A. Binks, Clearing of Congested Drains and Sewers.—14,715, J. Quarnby, Traps for Drains, Water-closets, &c.—14,752, L. Robson, Connecting Sash-cords to Window Sashes.—14,779, L. Seager, Jointing Pipes, Tubes, &c.—14,786, W. Sharpe and W. Cruickshanks, Multiple Flushing Syphon for giving any number of syphon flushes from large cisterns.—14,877, J. Travis, Sash Fasteners for Windows.—14,879, A. Taylor, Service Flushing Cisterns.—14,952, T. Knowles, Revolving Receptacles for Waste Water to be used in the flushing of Water-closets flushed with Waste-water.—15,241, E. Andrews, Window-sashes.—15,251, W. Priest, White Lead.—15,266, E. Van den Hoff, White Lead.—15,330, W. Nicol, Sash-frames of Windows.—15,368, J. Martin and others, Brick Kilns.—15,380, R. Rosoman, Ventilators.—15,488, W. Hinton, Surveying Instruments.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

19,681, H. Barrance & E. Simmons, Attachment of Knobs to Spindles.—19,943, J. Jones, Stoppers for Drains.—8,110, A. and F. Johnson, Water-closets.—13,334, A. Fitchew, Combined Casement Stay and Hook.—13,994, W. Gibbin, Junior, Window-sashes.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

AUGUST 23.—By *Worsfold & Hayward*, at Dover: "The Guildhall Vaults" Public House, Bench-st., Dover, f., r. 80*l.*, 2,600*l.*

AUGUST 28.—By *W. W. Jenkinson*: f.g.r. of 28*l.* 10*s.*, Peckham-pk.-rd., Old Kent-rd., reversion in 19 yrs., 1,010*l.*; 40, 42, 44, and 46, Sumner-rd., Peckham, u.t. 66 yrs., g.r. 12*l.* 16*s.*, 810*l.*; 8, 10, 12, 14 and 16, Besson-st., New Cross, f., 610*l.*; 24, 26, 28 and 30, Besson-st., and a g.r. of 10*l.* 7*s.* 750*l.*; f.g.r. of 12*l.* 16*s.*, Archbishop's-pl., Brixton, reversion in 56 yrs., 320*l.*

AUGUST 30.—By *Stimson & Sons*: An improved rental of 22*l.* 10*s.*, Plaistow-rd., West Ham, u.t. 58 yrs., 345*l.*; an improved rental of 53*l.*, u.t. 51 yrs., 900*l.*; improved rentals of 36*l.*, u.t. 51 yrs., 435*l.*; 27, Almeida-st., Islington, u.t. 37 yrs., g.r. 8*l.*, 400*l.*; 4, 5, and 6, Fleming-st., Kingsland, u.t. 1 yr., g.r. 15*l.*, 16*l.*; 69 and 69, Albany-rd., Old Kent-rd., f., r. 52*l.*, 675*l.*; 66 to 76 (even),

Albany-rd., f., 1,880*l.*; 70, 80, 82, 84, 88 and 90, Albany-rd., f., 1,700*l.*; 53 to 61 (odd), Albany-rd., f., 1,300*l.*; 5 and 7, Odell-st., f., 500*l.*; 58 to 70 (even), Bagshot-st., f., 1,780*l.*—By *A. & A. Field*: 62 and 64, Ballance-rd., Homerton, u.t. 66 yrs., g.r. 6*l.* 6s., 290*l.*—By *Newton & Co.*: 1, 3, 5, 7 and 11, Bryantwood-rd., Highbury, f., r. 192*l.*, 2,750*l.*; f.g.r. of 6*l.* 10s., Bryantwood-rd., reversion in 69 yrs., 155*l.*; "The Manor House," Holcroft-rd., Hackney, f., 225*l.*; 26, Montagu-rd., Hornsey, u.t. 93 yrs., g.r. 6*l.* 6s., 250*l.*; 1, Rochester-ter., Camden-rd., u.t. 50 yrs., g.r. 4*l.*, r. 50*l.*, 410*l.*; 30, Glyn-st., Vauxhall, u.t. 71 yrs., g.r. 5*l.*, 360*l.*; 24, Auckland-st., u.t. 69 yrs., g.r. 5*l.*, 250*l.*—By *Phillips, Lea, & Davies*: 1, Newnham-st, Whitechapel, u.t. 34 yrs., g.r. 3*l.* 10s., 300*l.*; 2 to 12, Newnham-st., u.t. 34 yrs., g.r. 38*l.* 10s., r. 92*l.*, 3,320*l.*; 13 and 14, Newnham-st., u.t. 34 yrs., g.r. 6*l.* 10s., r. 57*l.* 10s., 745*l.*; 15 to 27, Newnham-st., u.t. 34 yrs., g.r. 52*l.* 5s., r. 346*l.*, 3,735*l.*; 31, Newnham-st., u.t. 34 yrs., g.r. 3*l.*, r. 30*l.*, 325*l.*; 2, Tenter-st. West, u.t. 34 yrs., g.r. 3*l.* 5s., r. 25*l.* 10s., 340*l.*; a range of sheds in rear of 11, 12 and 13, Newnham-st., u.t. 34 yrs., g.r. 2*l.*, 8*l.*

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.

Greenheart, B.G.	ton	8/0/0 0/0/0
Teak, E.I.	load	20/0/0 16/0/0
Sequoia, U.S.ft.cu		2/3 2/6
Ash, Canada	load	2/15/0 4/0/0
Birch, do.		2/10/0 3/15/0
Elm, do.		3/10/0 4/15/0
Fir, Dantsic, &c.		1/5/0 3/0/0
Oak, do.		2/10/0 4/10/0
Canada		6/0/0 7/10/0
Pine, Canada red		2/15/0 3/5/0
Do. Yellow		2/15/0 5/0/0
Lath, Dantsic, fath		4/10/0 5/10/0
St. Petersburg		5/0/0 6/10/0
Wainscot, Riga, &c., log		2/10/0 4/15/0
Odessa, crown		2/10/0 4/15/0
Deals, Finland		
2nd & 1st std	100	7/10/0 9/10/0
Do. 4th & 3rd		7/0/0 8/10/0
Do. Riga		7/10/0 9/0/0
St. Petersburg, 1st yellow		10/0/0 13/10/0
Do. 2nd yellow		8/10/0 10/5/0
Do. white		8/10/0 11/0/0
Swedish		7/10/0 16/10/0
White Sea		7/0/0 15/10/0
Canada, Pine 1st		22/10/0 29/0/0
Do. do. 2nd		17/0/0 18/0/0
Do. do. 3rd, &c.		7/10/0 10/10/0
Do. Spruce, 1st		8/10/0 11/0/0
Do. do. 3rd & 2nd		6/10/0 7/10/0
New Brunswick		6/0/0 7/5/0
Battens, all kinds		3/0/0 15/0/0
Flooring boards, 1¼ in. prep. 1st		0/9/6 0/14/6
Do. 2nd		0/7/0 0/11/6
Other qualities—		0/5/0 0/6/6
Cedar, Cuba	ft.	3½ 4½
Honduras, &c.		3½ 4½
Mahogany, Cuba		3½ 6
St. Domingo, cargo	av.	3 1/6
Mexican do. do.		3 4
Tobasco do. do.		3½ 6
Honduras do.		3½ 5½
Box, Turkey	ton	4/0/0 13/0/0
Rose, Rio		7/0/0 18/0/0
Bahia		6/0/0 17/0/0
Satin, St. Domingo		0/0/5 0/1/0

TIMBER (*continued*).

Satin, Porto Rico	0/0/6	0/1/6
Walnut, Italian	0/0/3½	0/0/7

METALS.

Iron—Pig, in Scotland	ton	2/3/7 0/0/0
Bar, Welsh, in London		5/12/6 5/15/0
Do. do. at works in Wales		5/2/6 5/5/0
Do. Staffordshire, in London		6/0/0 6/10/0
COPPER—British cake and ingot		42/5/0 42/15/0
Best selected		42/10/0 43/10/0
Sheets, strong		51/0/0 0/0/0
Chili, bars		40/2/6 40/7/6
YELLOW METAL	lb	0/0/4½ 0/0/4½
LEAD—Pig, Spanish	ton	9/18/9 0/0/0
English com. brands		10/2.6 10/5/0
Sheet, English, 6 lbs. per sq. ft. and upwards		11/5/0 0/0/0
Pipe		11/15/0 0/0/0
ZINC—English sheet	ton	19/0/0 19/0/0
Vieille Montagne		19/10/0 0/0/0
TIN—Straits		71/17/6 72/7/6
Australian		72/7/6 72/17/6
English Ingots		73/0/0 73/10/0
Banca		74/0/0 74/10/0
Billiton		72/10/0 73/0/0

OILS.

Linseed	ton	20/2/6 20/7/6
Cocoanut, Cochin		29/10/0 0/0/0
Do. Ceylon		25/0/0 0/0/0
Palm, Lagos		25/10/0 26/0/0
Rapeseed, English pale		21/15/0 0/0/0
Do. brown		20/0/0 0/0/0
Cottonseed ref.		20/5/0 21/5/0
Oleine		22/0/0 24/0/0
Lubricating, U.S.		4/0/0 5/0/0
Do. refined		5/0/0 12/0/0
TAR—Stockholm	barrel	0/22/0 0/0/0
Archangel		0/11/0 0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursday.*]

ALNWICK.—For the erection of St. James's Presbyterian Church. Mr. W. Lister Newcombe, architect, 89, Pilgrim-street, Newcastle-on-Tyne. Quantities by the architect:—
Carse & Son, Amble £3,475 2 6

BLAENAVON (Mon.).—For the erection of business premises, for Mrs. R. Fowler. Mr. E. A. Johnson, architect, Abergavenny. Quantities by architect:—
J. Bevan ..... £1,317 5 7 | J.H. Burgoyne, Blaenavon (accepted) £895 0 0
J. Morgan 912 0 0

BLAGDON (Somerset).—For additions, &c., to school buildings, for the District School Board. Mr. Frank W. Wills, architect, Foster's-chambers, Small-street, Bristol:—
W. Cowlin & Son ..... £618 0 | E. Love £559 0
W. Veals ..... 594 0 | J. Lovett 533 0
J. Bastow ..... 590 0 | Sales Cook 517 0
R. Wilkins & Sons ..... 589 0 | G. Dennis 477 12
C. Edwards ..... 560 0 | J. & C. Clark, Blagdon* 444 0
*Accepted.

BOURNEMOUTH.—For building a villa residence at Courthill Park, for Messrs. Clarke & Short, architects, Parkstone:—
W. J. Chinchen, East Cliff Gardens £563

BOURNEMOUTH.—For building a golf pavilion at Meyrick Park, for the Corporation:—
T. Hoare & Son ..... £1,039 | W. J. Chinchen £950
Shears & Son ..... 995 | M'William & Son 897
J. White 950

BRIGHOUSE (Yorks.).—Accepted for the erection of new bank, for the London and Yorkshire Bank. Mr. C. S. Nelson, architect, 20, Park-row, Leeds. Quantities by the architect:—
Masonry.—Charles Fearnley, Brighouse ....
Joinery.—T. Bottomley, Brighouse.....
Plumbing and Glazing.—Waddington & Roebuck, Brighouse .....
Plastering.—C. Heponstall, Brighouse .....
Slating.—J. Smithies, Bradford .....
Painting.—J. W. Turner, Brighouse .....
} £2,487 3 8

BRENTWOOD.—For pulling down the "King's Head," and erecting a new inn and shop premises, for the Old Hornchurch Brewery Company. Mr. A. T. G. Woods, architect, New-road, Brentwood. Quantities by architect:—
Rogers & Robson £1,130
Hammond & Son, Romford (accepted) 1,120

CLARE (Suffolk).—For enlarging school buildings, for the School Board. Mr. W. M. Fawcett, architect, Cambridge:—
Mason & Son ..... £369 10 | W. G. Jarvis, Clare* £357 15
* Accepted.

CRAWLEY (Sussex).—For the erection of shops, Handcross, for Mrs. Bradley. Mr. C. H. Burstow, architect, 40, North-street, Horsham:—
Pannett Bros. ..... £236 13 | Peskett & Ayling £196 15
M. Etheridge ..... 237 15 | George Wheatland, Handcross (accepted) . 163 0
P. Peters 220 0
Rowland Bros. 197 0

DORCHESTER.—For building additional bedrooms at "The Temperance Commercial Hotel," 44, South-street, for Col. R. Williams. Mr. A. L. T. Tilley, architect, 16, Cornhill, Dorchester:—
P. Barrett & Son ..... £285 | R. Davis & Son £245
J. Guy & Son ..... 248 | C. E. Slade (accepted) 239
[All of Dorchester].

FERMOY (Ireland).—For the erection of three labourers' cottages, for the Union Guardians:—
James Collins ..... £125 each cottage.
Thomas Nelligan, Ballyhooly* ..... 123 "
* Accepted.

GREAT WRATTING (Suffolk).—For the erection of stabling, &c., at Great Wratting Hall, for the Hon. W. F. D. Smith, M.P. Mr. C. P. Ayres, architect, 14, High-street, Watford:—
Grimwood ..... £2,137 | Mason & Son, Haverhill, (accepted) £2,050
Arber 2,105
Jarvis 2,067

GRIMSBY.—For building the "Wintringham Higher Grade School," for the Great Grimsby School Board. Mr. Herbert C. Scaping, Architect and Diocesan Surveyor, Grimsby. Quantities by Mr. J. Watson, quantity surveyor, Hull:—
Guy & Gooseman £10,351 13 9 | Hewins & Goodhand, Grimsby* £8,572 10 0
J. M. Thompson & Sons 9,087 0 0
H. J. Vickers 8,898 8 4
* Accepted.

HALIFAX.—Accepted for rebuilding the "Wheatsheaf" Inn, Market-street. Messrs. Jackson & Fox, architects, 22, George-street, Halifax. Quantities by the architects:—
Excavating and Masonry.—Thomas Pickles, Luddendenfoot £1,490 0
Carpentry and Joinery Work.—Fielden & Bottomley, Halifax 460 12
Plumbing and Glazing.—John Naylor & Son, Halifax.. 205 0
Slating and Plastering.—Joseph Bancroft & Son, Halifax 193 9
Concreting.—Geo. Greenwood & Son, Halifax 54 16

HANWORTH.—For building Mission Hall, for Mr. W. Whiteley. Mr. A. M. Ridge, architect, 124, Newgate-street:—
A. Wright ..... £4,432 14 3 | J. W. Brooking £3,497 0 0
Oldridge & Sons .... 3,825 0 0 | T. N. Toole & Son . 3,451 0 0
J. W. Jarvis ..... 3,745 0 0 | T. Hiscock 3,295 0 0
G. Parker .... 3,705 0 0 | J. F. Collinson 3,294 0 0
W. Brown ..... 3,593 0 0 | T. Nye 3,121 0 0
J. Smith & Sons 3,509 0 0

HARROGATE.—For additions, &c., to Heatherdene Convalescent Home. Mr. John Eltringham, architect, 62, John-street, Sunderland. Quantities by architect:—
Wm. Nicholson ..... £3,840 | T. Linskill £3,278
W. Sexton ..... 3,574 | W. Topham 3,165
D. Simpson ..... 3,460 | W. Ives & Co. 3,099
J. Simpson 3,390

KESTON (Kent).—Accepted for the erection of two cottages at Keston, Kent, for Mr. A. C. Norman. Messrs. Waring & Nicholson, architects, 55, Parliament-street, Westminster, S.W.:—
Wm. Smith £615

KINGSTEIGNTON (Devon).—For additions to the National Schools, for the Rev. Percival Jackson. Mr. Samuel Seagar, architect, Union-street, Newton Abbot:—
Francis Bros. ..... £368 15 | Wm. Gillard, Kingsteignton (accepted) £311 10
F. A. Stacey 359 0
Hugh Mills 337 17

LANGLEY MOOR (Durham).—For the erection of a house. Mr. Frankland Smith, architect, Brancepeth, Durham:—
Wm. Rhodes £247 4
Shepherd & Oyston, Langley Moor (accepted) 210 8

LEICESTER.—For the erection of cottages, Pye Bridge. Mr. Charles Kempson, C.E., architect:—

Whole of the work.

Macandrews	£1,699	M. Martin	£1,540
Richardson & Son	1,579	Stubbs	1,430
Major	1,550		

Bricklaying.

Brentnall	£712	Tebbatt	£625
Stubbs	672	Lee, Nottingham*	593

Joinery.

Hanson	£533	Cole	£312
Williamson	450	Lee, Nottingham*	300
Tebbatt	407	Stubbs	279
Bailey	355		

Slating.

Broadbent	£92	Nixon & Knowles	£82
Mills	89	Lee, Nottingham*	85

Plastering.

Williamson	£120	Tebbatt	£117
Brentnall	110	Lee, Nottingham*	100
Woolley	109	Stubbs	97

Plumbing.

Shaw	£200	Bamber	£170
Burnham	186	Lee	162
Getliffe	179	Pallet	161
Rowlatt & Freer	172	Burton, Alfreton*	152

Painting.

Williamson	£65	Stubbs	£46
Burnham	63	Lee	46
Shaw	56	Burton, Alfreton*	38

* Accepted.

LONDON.—For exterior painting, &c., at Vere-street School, for the School Board for London. Mr. T. J. Bailey, Architect:—
Leeks & Hooker ..... £129 | Peattie & Axtell £84
Gurling ..... 124 | Minter 81
Green ..... 110 | Cruwys 77
Rowe ..... 94 | Hornett 68
Marchant & Hirst 86

LONDON.—For interior painting, &c., of Brecknock-road School for the School Board for London. Mr. T. J. Bailey, architect:—
Yerbury & Sons ..... £599 15 | Houghton & Son £360 0
Ballard ..... 454 12 | Williams & Sons 319 10
W. H. Stevens ..... 452 0 | Kirby & Chase 317 10
Riley ..... 420 0 | Marchant & Hirst 279 0
Willmott & Son 375 0

LONDON.—For exterior painting of Wescott-street School, for the School Board for London. Mr. T. J. Bailey, Architect:—
Gurling ..... £191 10 | Marchant & Hirst £117
Harding & Son ..... 150 0 | Johnson & Co. 116
Leek & Hooker ..... 149 0 | Nightingale 106
Garrett & Son ..... 140 0 | Williams 98

LONDON.—For exterior painting of William-street Schools, for the School Board for London. Mr. T. J. Bailey, Architect:—
Gurling ..... £239 18 0 | Hammond £92 5 3
Chinchen ..... 109 18 0 | Brown 90 0 0
Polden ..... 109 10 0 | Marchant & Hirst 89 10 0
G. & F. Kent 93 0 0

LONDON.—Accepted for additions and repairs to "Ginesfield, King's-road, Clapham Park, S.W. Mr. Herbert Riches, architect, 3, Crooked-lane, King William-street, London, E.C.:—
Osborn & Sons £368 10

LONDON.—For the erection of Mission Room, Canterbury-road, Kilburn, N.W. Mr. William A. Pite, architect, 11, Hart-street, Bloomsbury-square, W.C. Quantities by Mr. Joseph Rookwood:—
Thomas Pessell ..... £764 10 | Godson & Son £607 0
Yerbury & Sons ..... 673 0 | F. T. Chinchen 594 10
Oldrey & Son ..... 655 0 | S. Butler (withdrawn) .. 438 10
G. Neal 625 0

LONDON.—For alterations to the "Harpur Arms," Theobald's-road, for Mr. Andrews. Messrs. Thorpe & Furniss, architects:—
Lamble ..... £1,649 | Antill & Co. £1,389
Courtney & Fairbairn .... 1,465 | Toms 1,342
Anley ..... 1,416 | Gould & Brand 1,232

LONDON.—For alterations to the "Freemasons' Arms," Downshire Hill, Hampstead, exclusive of glass. Messrs. Furniss & Thorpe, architects:—
Toms ..... £1,458 | Lamble £1,342
Voller ..... 1,450 | Gould & Brand 1,29
Anley 1,400

LONDON.—For new stables and billiard-room at Wychcombe, Haverstock Hill, for Mr. T. Bellamy. Mr. R. Groom, architect:—
Toms ..... £1,191 | Gould & Brand £1,048
Pugh ..... 1,123 | Goodwin 1,047

LONDON.—For pulling down and rebuilding the "Two Brewers" public-house, and warehouse adjoining, Dysott-street, W.C., for Messrs. Meux & Co., Limited. Messrs. Gardiner, Son, & Theobald, architects and surveyors:—
Hayworth ..... £3,595 | Todd £3,449
Downes ..... 3,577 | Godfrey 3,387
Allen & Sons ..... 3,565 | Toms 3,295
Burman ..... 3,500 | Gould & Brand 3,273
Ansell 3,456

LONDON.—For rebuilding Nos. 50 and 52, Page's-walk, Bermondsey, for Sir Francis Powell. Messrs. Waring & Nicholson, architects, 55, Parliament-street, Westminster, S.W.:—
T. Lapthorne & Co. .... £731 0 | J. F. Ford £679 0
J. Marsland ..... 705 0 | H. Hall* 679 10
W. Smith ..... 705 0 | * Accepted.

MANSFIELD.—For alterations and additions to the "Angel" Inn, Clown, for the Mansfield Brewery Co. Mr. R. Frank Vallance, architect, Mansfield:—
John Greenwood .... £365 0 0 | Adam Eastwood, Warsop (accepted) £289 10 0
S. & G. Frisby ..... 333 0 0 | Henry Baker 284 17 6
J. Collingham 305 0 0
Revill & Sharman .. 296 7 4½

MANSFIELD.—For the erection of a warehouse, Peacock-street, for Mr. Webster. Mr. R. Frank Vallance, surveyor, Mansfield:—
John Brailsford* ..... £410 0 0 | Fisher Bros. £350 0 0
Hy. Vickers* ..... 385 0 0 | S. & G. Frisby, Mansfield (accepted) 339 0 0
W. A. Vallance ..... 378 0 0 | Harvey & Ashley 338 10 0
H. Alsop 377 0 0
John Greenwood 351 2 8
* Too late.

MITCHELSTOWN (Ireland).—For the erection of house, &c., for the Union Guardians. Mr. Thos. A. Walsh, C.E., Kilmallock. Mr. John Doherty, of Galbally, clerk of works:—
Daniel Hayes ..... £1,250 | Nicholas Gaffney, Kilmallock, co. Limerick* £850
Denis Creedon 1,150
Thomas A. Walsh ..... 949 | * Accepted.

OFFHAM (Kent).—For making sundry alterations and additions to the Board Schools. Mr. Walter Goodwin, architect:—
G. Hodges & Son ..... £199 0 | Davis & Leaney £169 15
T. Butterick ..... 191 0 | William Coker 149 10
T. F. & G. Bishop ..... 187 10 | Thomas Webb, East Peckham, *..... 143
Horscroft & Mills ..... 176 0 | * Accepted.
H. J. Lee 170 0

PUDSEY (Yorks.).—Accepted for the erection of business premises for the London and Yorkshire Bank, Limited. Mr. C. S. Nelson architect, Royal Insurance Buildings, 10, Park-row, Leeds. Quantities by the architect:—
Masonry.—J. Moulson & Son, Bradford ..
Joinery.—Appleyard Bros., Bramley ....
Plumbing and Glazing.—G. Lazenby, Leeds .....
Plastering.—A. & S. Wheater, Calverley
Slating.—F. Thompson, Stanningley ....
Painting.—J. Nicholson, Pudsey .....
} £2,360 10 0

RADLETT (Herts.).—For the erection of shop and premises, for Mr. H. Cole. Mr. C. P. Ayres, architect, Watford:—
Boff, Bros. ..... £915 | Andrews £740
Barnes & Williams 878

RADLETT (Herts).—Accepted for the erection of a pair of villa residences, for Mr. F. Wilson. Mr. C. P. Ayres, architect, 14, High-street, Watford :—
Brightman (Watford) £1,000

WALSALL.—For the erection of new buildings, Queen Mary's Schools, Walsall. Messrs. Bailey & McConnal, architects. Quantities by the architects :—

H. Willcock & Co.	£4,875	Harley & Son	4,228
R. Jones	4,700	J. Mallin	4,195
Barnsley & Sons	4,698	W. Wistance	4,086
H. Lovatt	4,509	W. & J. Webb	4,084
T. Rowbotham	4,416	W. Hopkins	4,072
W. Kendrick	4,358	Guest & Son	3,958
J. Bowen	4,300	R. M. Hughes, Birmingham * (accepted)	3,921
J. Lynex	4,239		

WATFORD.—For the erection of school for 480 boys, with central hall, in the Leavesden-road, Watford, for the School Board. Mr. Charles P. Ayres, Architect, 14 High-street, Watford. Quantities by Mr. W. Bailey :—

		Extra for hall faced with Arlsey bricks.
Brown & Sons	£5,139	£90 0
Yerbury & Sons	4,933	36 0
J. Darvill	4 861	62 16
J. Payne	4,778	20 0
W. B. Neal	4,694	36 12
A. Kellett	4,584	52 12
Foster & Dicksee	4,490	45 0
Webster & Cannon	4,428	43 0
Somerford & Sons	4,379	15 0
G. & J. Waterman	4,372	48 0
Gough & Co.	4,360	24 0
G. Wiggs	4,316	65 0
T. Turner, Ltd.	4,300	43 0
C. Eames	4,295	51 0
Parnell & Sons	4,269	—
Andrews & Sons	4,240	70 0
F. Dupont	4,237	32 0
C. Brigham, Watford *	4,095	40 0
Kerridge & Shaw	4,060	45 0

[Architect's estimate, £4,400.]
* Accepted subject to approval of the Education Department.

WATFORD (Herts.).—For the erection of a hospital for infectious diseases, for the Watford Rural Sanitary Authority. Mr. Charles P. Ayres, architect, 14, High-street, Watford :—
Andrews & Son, Watford* £11,390
*Approved by the Local Government Board and accepted.

WEYMOUTH.—For alterations to bar, &c., "The Portland Railway Hotel," for Messrs. Hall & Woodhouse. Mr. A. L. T. Tilley, architect, 16, Cornhill, Dorchester :—
J. Innes £133 10
J. & H. Bagg, Weymouth (accepted) 110 0

WOODFORD.—Accepted for addition to "Clifton Cottage,' Cleveland-Road, South Woodford, Essex. Mr. Herbert Riches, architect, 3, Crooked-lane, King William-street, London, E.C. :—
W. Mundy £252

WOODFORD.—For the supply of 1,500 tons broken granite (Quenast), for the Local Board. Mr. C. Mathew, Surveyor, Board Offices, Woodford, Essex :—
C. M. Manuelle, London ..... 11s 7d. per ton.

WREXHAM.—For the erection of class-rooms, &c., Rehoboth Wesleyan Chapel, Coedpoeth :—

Samuel Moss	£890 0 0	Wm. Owen, Ruabon-road, Wrexham*	£687 12 0
W. E. Samuel	872 0 0		
Thomas Williams	829 15 0		

* Accepted.

TO CORRESPONDENTS.

H. & W.—J. H.—G. H. W. (amounts should have been stated).—C. J. (we cannot undertake to answer such questions).—J. B. (below our mark).

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THE INDEX and TITLE-PAGE for Volume LXVI. (Jan. to June, 1894) were given as a supplement with the number for July 14 last.

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LIVERPOOL:
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GLASGOW:
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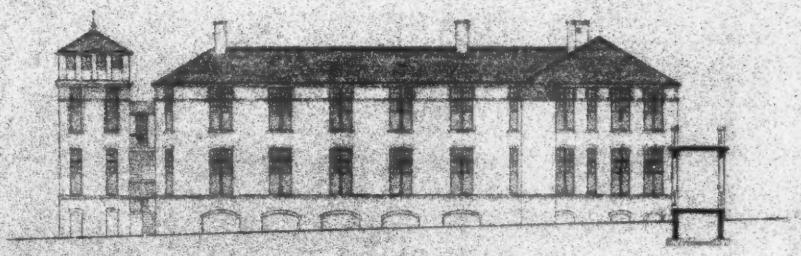
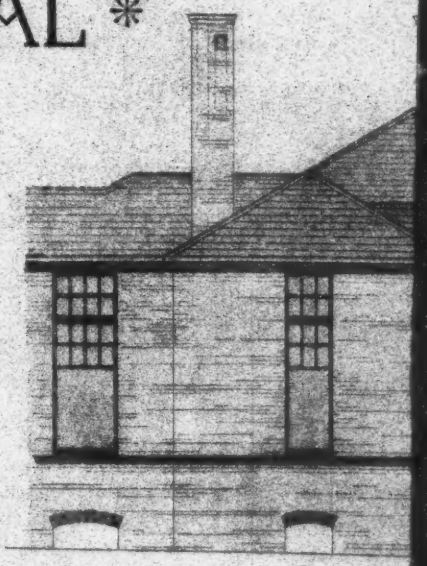
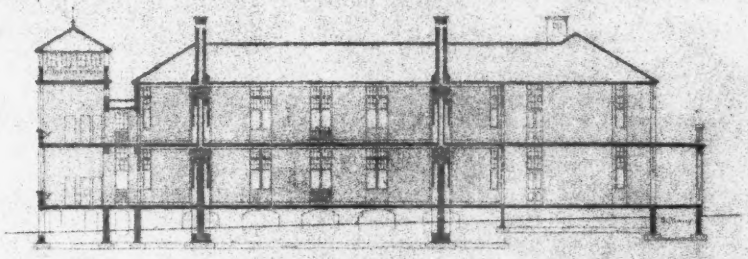


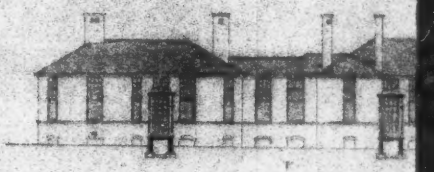
West Elevation



Detail a



Longitudinal Section



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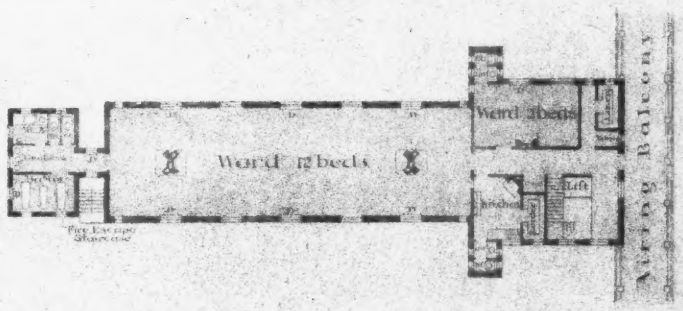
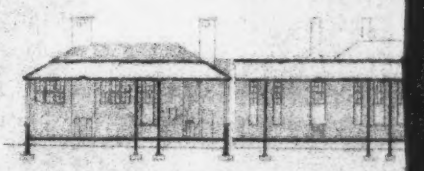


First Floor Plan



Longitudinal

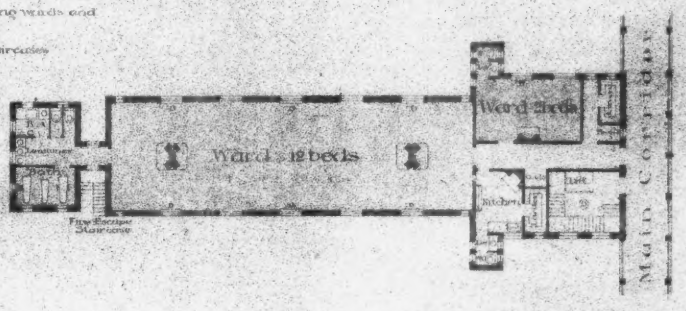
A Slop sink

B. Scalding sink with rack over for bed pans, and Cupboard under with for chamber utensils, the window carried down to floor and fitted with open grating & Shutter

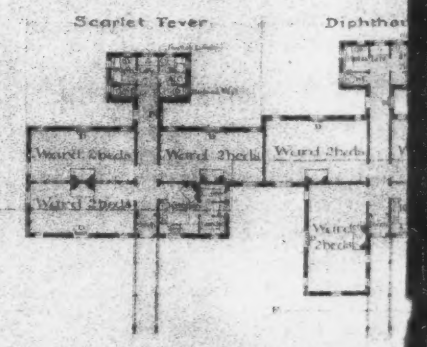
C Ladder for access to Cistern room

D Radiators for heating wards and warming fresh air

E See Report as to Staircases



Ground Floor Plan



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DIPHTHERIA OR ENTERIC FEVER PAVILIONS.

Marked B on Block Plan

Details similar to Scarlet Fever building

Scale of General Drawings

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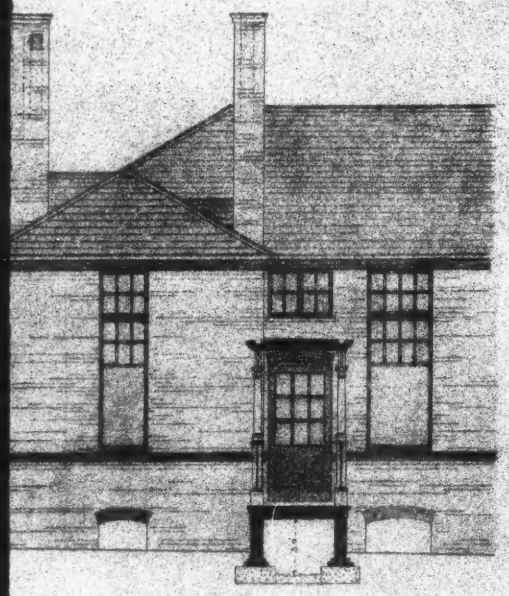
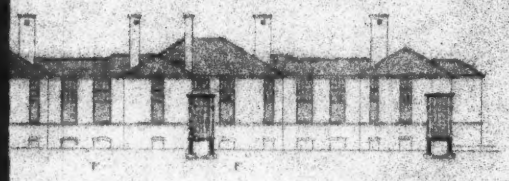
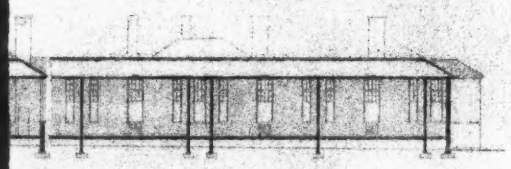


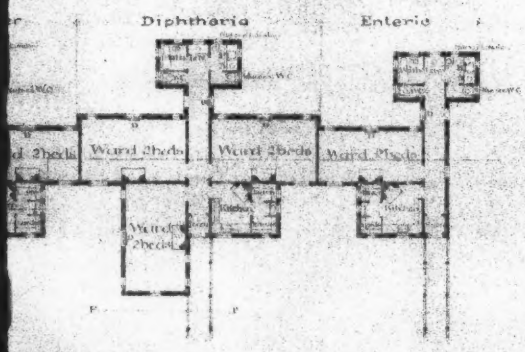
Detail at F F.



East Elevation



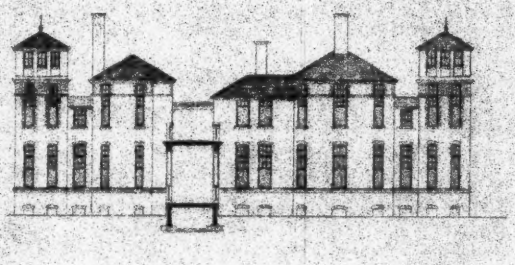
Longitudinal Section



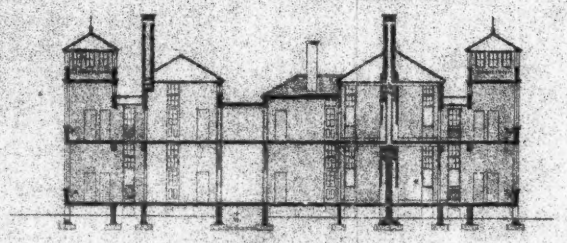
Ground Floor Plan

INFIRMARY

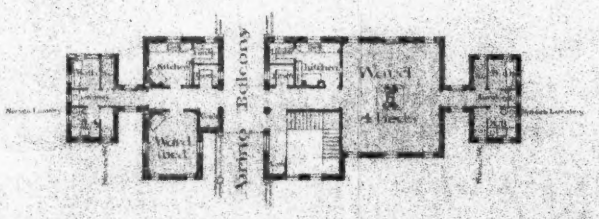
Scale of Detail drawing



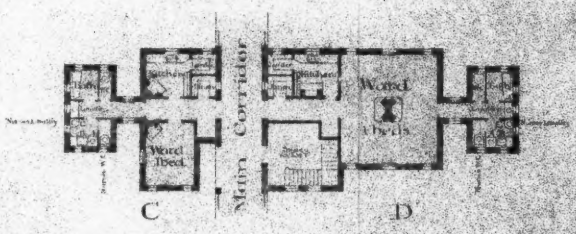
East Elevation



Longitudinal Section



First Floor Plan.



Ground Floor Plan

ISOLATION PAVILIONS.

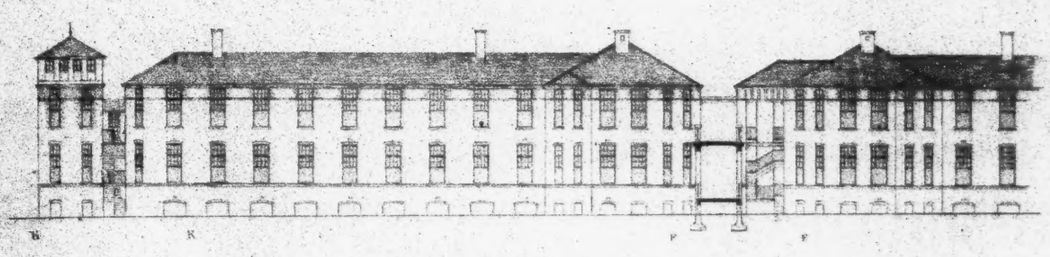
Marked C & D on Block Plan

Details similar to Scarlet Fever buildings

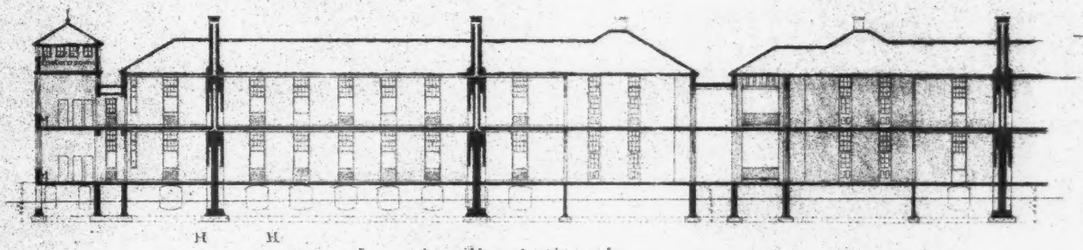
INK-PHOTO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

US DISEASES HOSPITAL.—Mr. E. T. Hall, F.R.I.B.A., Architect.

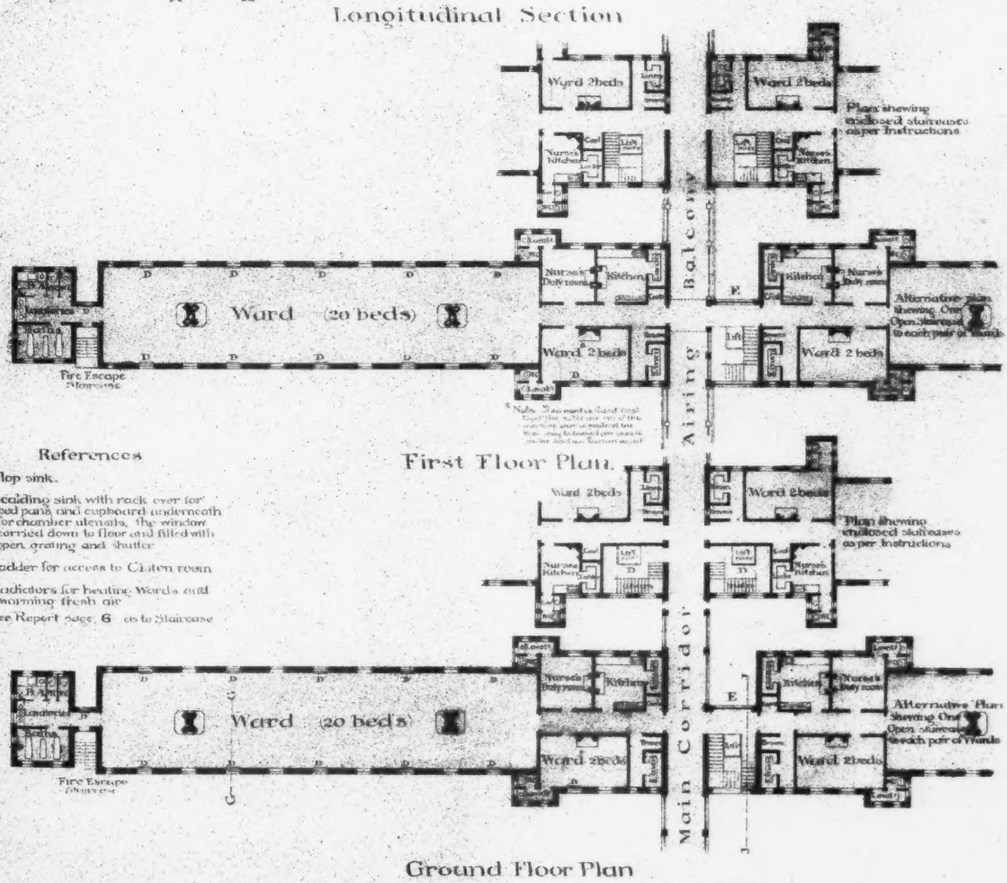
* THE PARK HOSPITAL *



West Elevation



Longitudinal Section



First Floor Plan.

Ground Floor Plan

References

A. Slop sink.

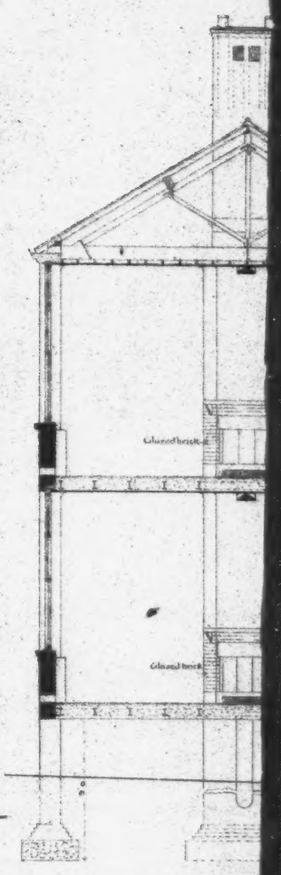
B. Scalding sink with rack over for bed pans and cupboard underneath for chamber utensils, the window carried down to floor and filled with open grating and shutter

C. Ladder for access to Cistern room

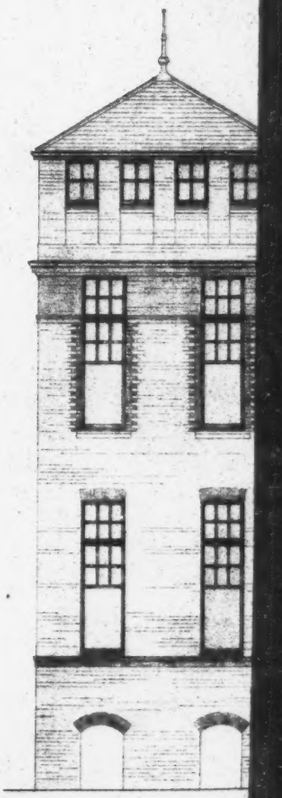
D. Radiators for heating Wards and warming fresh air

E. See Report page 6 as to Staircase

Scale of General drawings



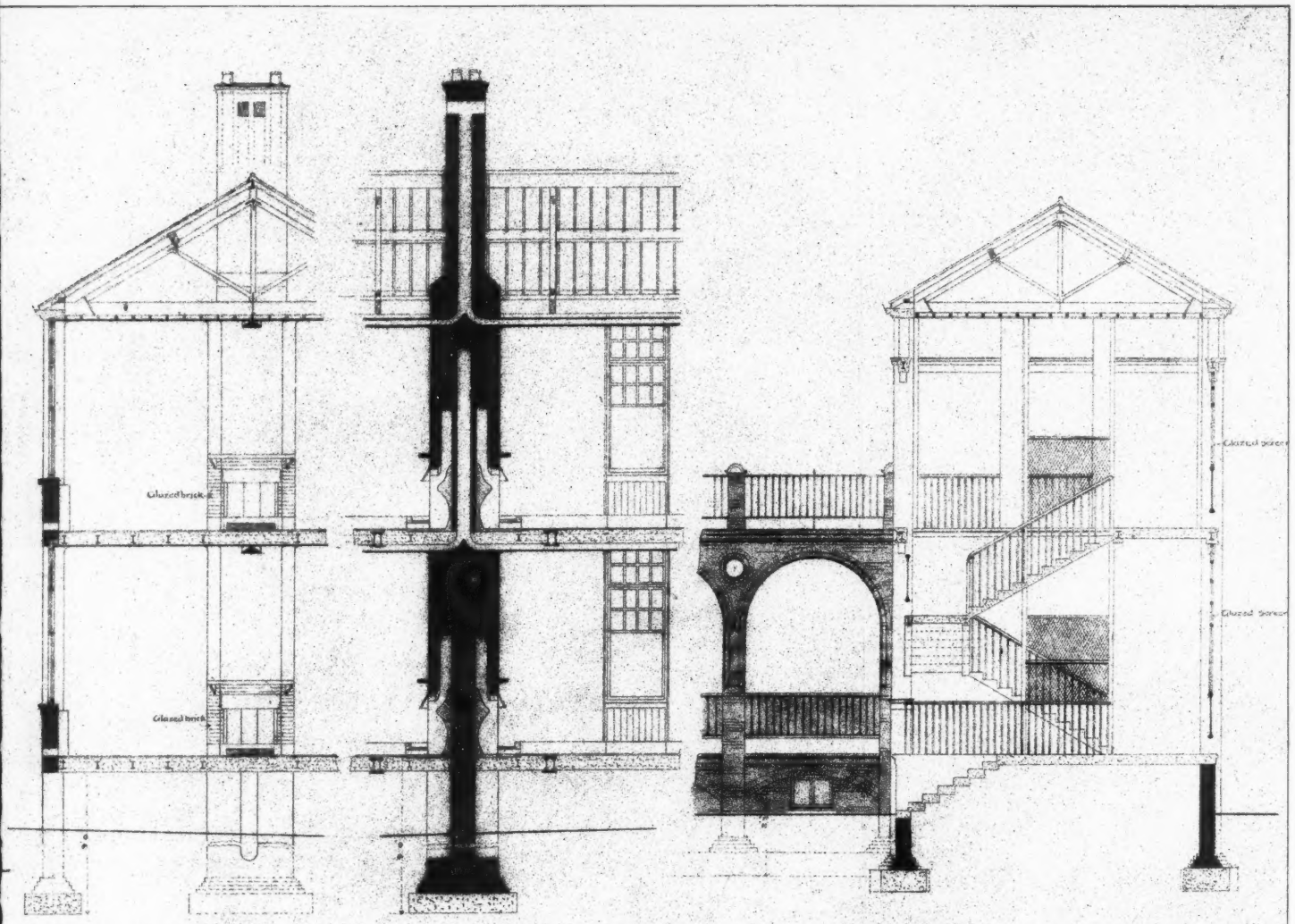
Detail section thro'



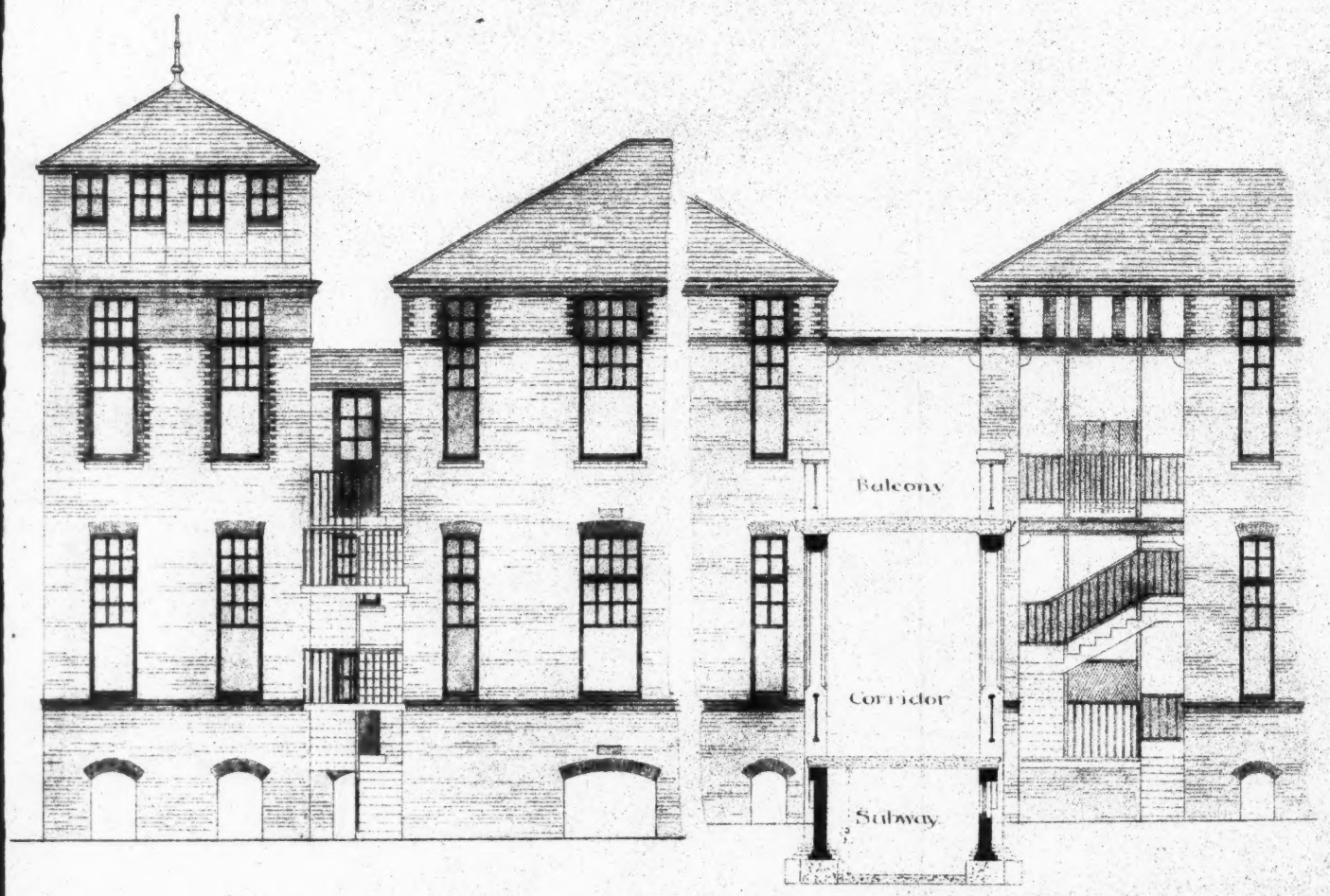
D

SCARLET FEVER PAVIL

Marked A on Block Plan



Detail section thro' G.G. Detail at H.H. Detail Section thro' J.J



Detail at K.K. Detail at F.F.

FEVER PAVILIONS.

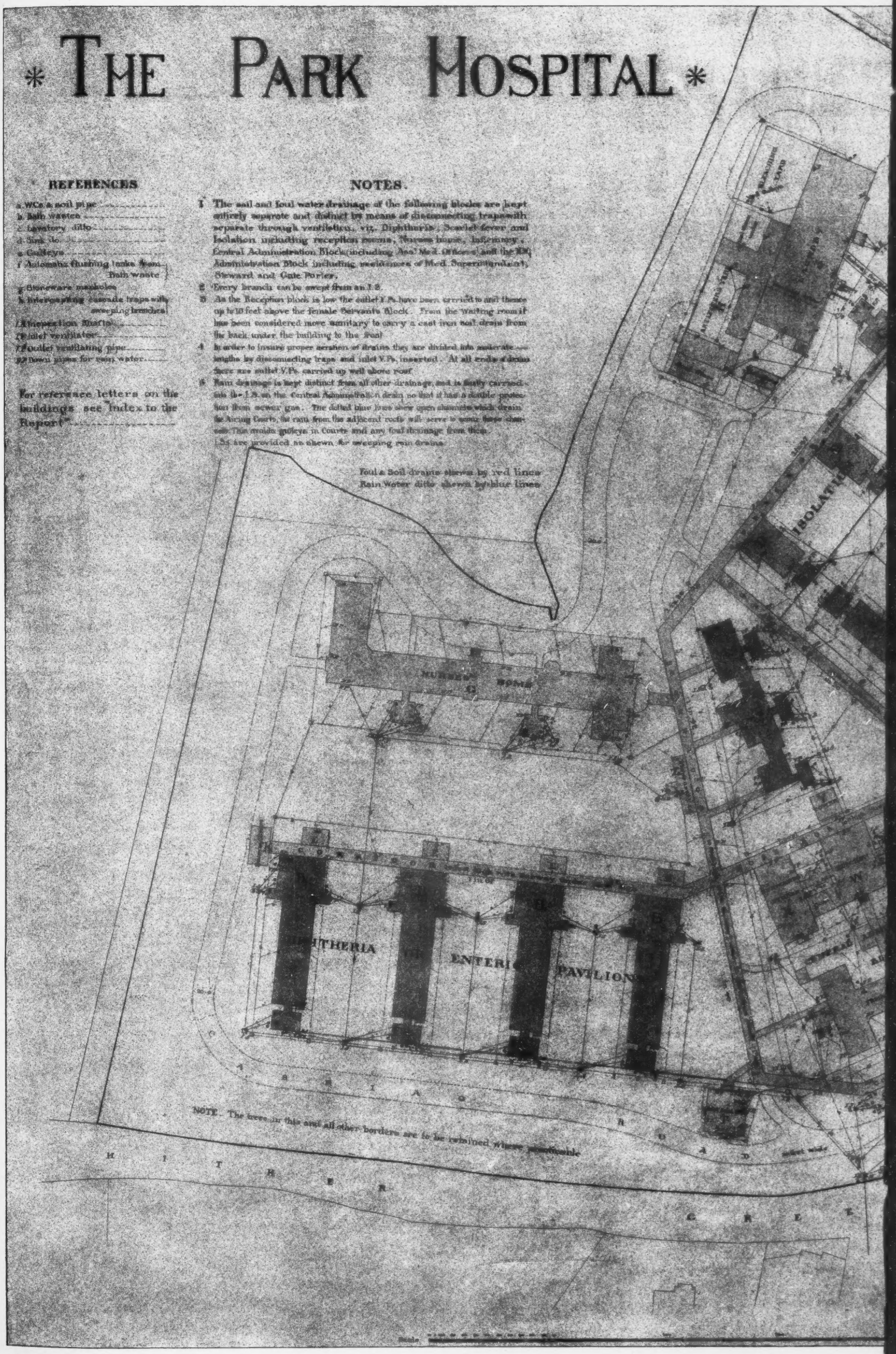
d A on Block Plan.

Scale of Detail drawings

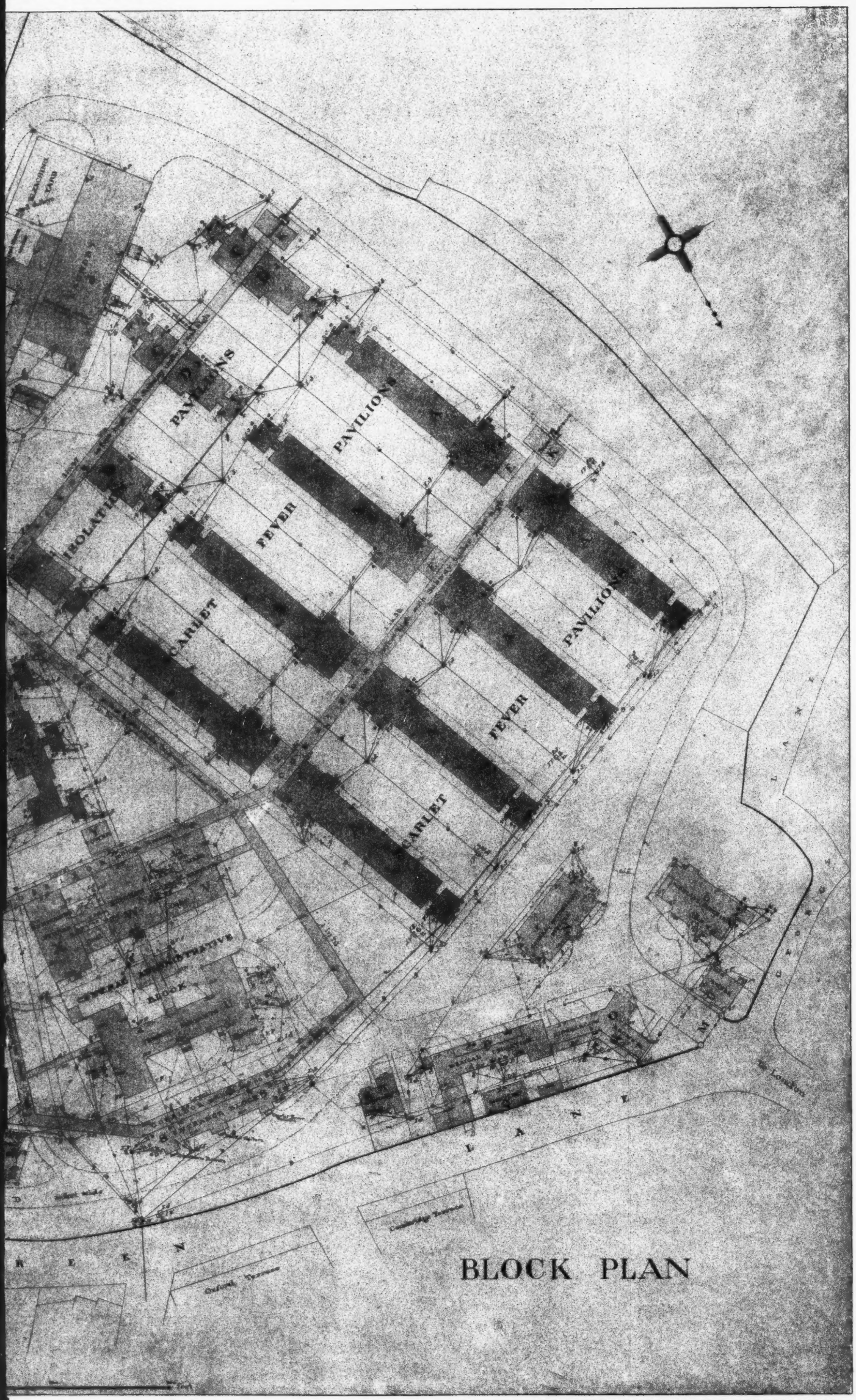
INK-PHOTO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

IOUS DISEASES HOSPITAL.—MR. E. T. HALL, F.R.I.B.A., ARCHITECT

* THE PARK HOSPITAL *

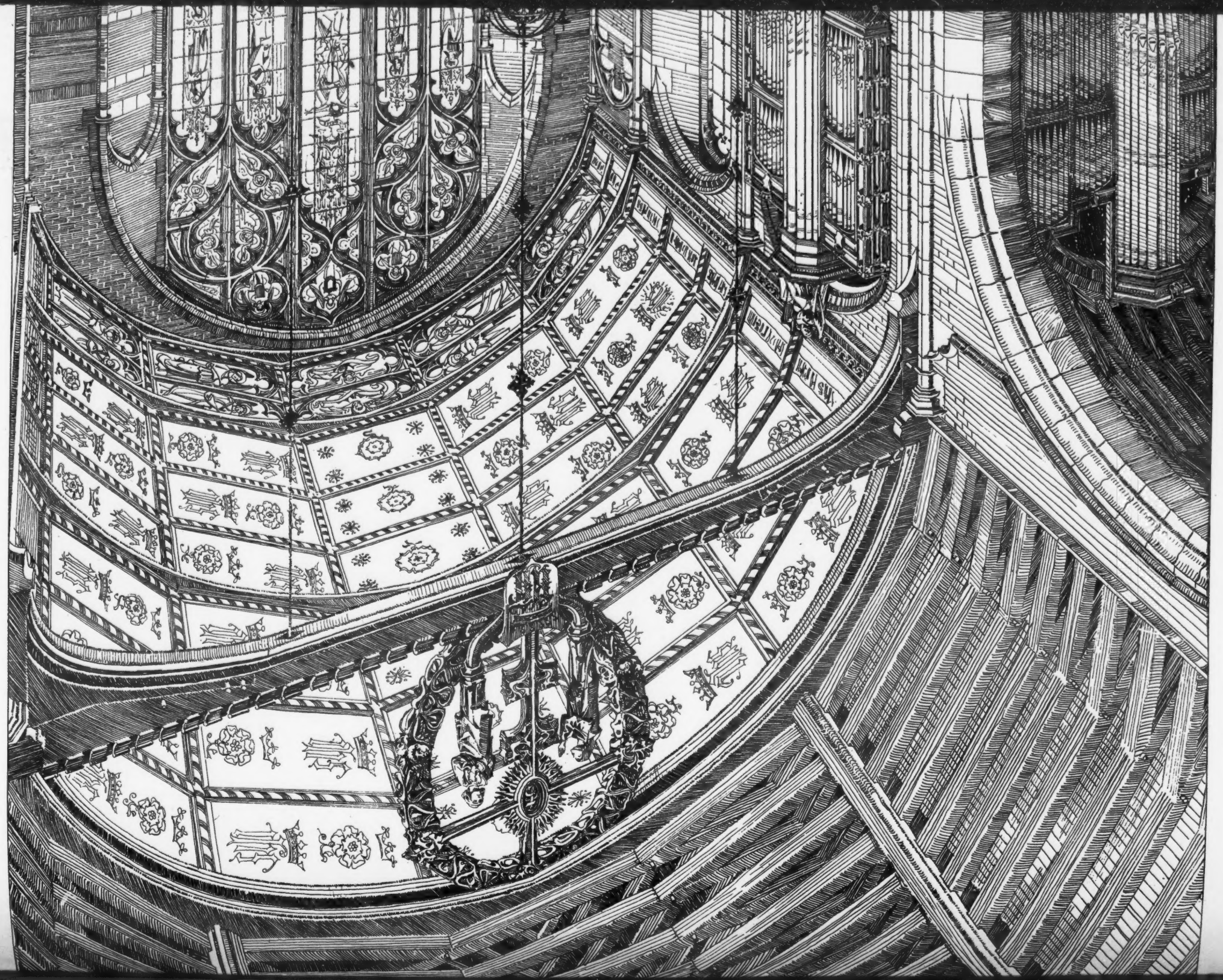

REFERENCES
a. WCs & soil pipe
b. Bath wastes
c. Lavatory ditto
d. Sink do.
e. Gulleys
f. Automatic flushing tanks from Bath waste
g. Stoneware manholes
h. Intercepting trapsside traps with sweeping branches
i. Inspection Shafts
j. Inlet ventilator
k. Outlet ventilating pipe
l. Down pipes for rain water
For reference letters on the buildings see Index to the Report
NOTES.
1 The soil and foul water drainage of the following blocks are kept entirely separate and distinct by means of disconnecting trapswith separate through ventilation, viz. Diphtheria, Scarlet fever and Isolation including reception rooms, Nurses house, Infirmary, Central Administration Block(including Asst Med. Officers) and the Administration Block including residences of Med. Superintendent, Steward and Gate Porter.
2 Every branch can be swept from an I.S.
3 As the Reception block is low the inlet V.Ps have been carried to and thence up to 10 feet above the female Servants Block. From the Waiting room it has been considered more sanitary to carry a cast iron soil drain from the back under the building to the Soil
4 In order to insure proper aeration of drains they are divided into moderate lengths by disconnecting traps and inlet V.Ps. inserted. At all ends of drains there are inlet V.Ps. carried up well above roof
5 Rain drainage is kept distinct from all other drainage, and is finally carried into the I.S. on the Central Administration drain no fear it has a double protection from sewer gas. The dotted blue lines show open channels which drain the Airing Courts, the rain from the adjacent roofs will serve to scour these channels. This avoids gulleys in Courts and any foul drainage from them.
Lts are provided as shewn for sweeping rain drains
Foul & Soil drains shewn by red lines
Rain Water ditto shewn by blue lines
NOTE. The trees in this and all other borders are to be retained where practicable
DIPHTHERIA
ENTERIC PAVILION
ISOLATION
NURSES HOUSE
HITHER GREEN

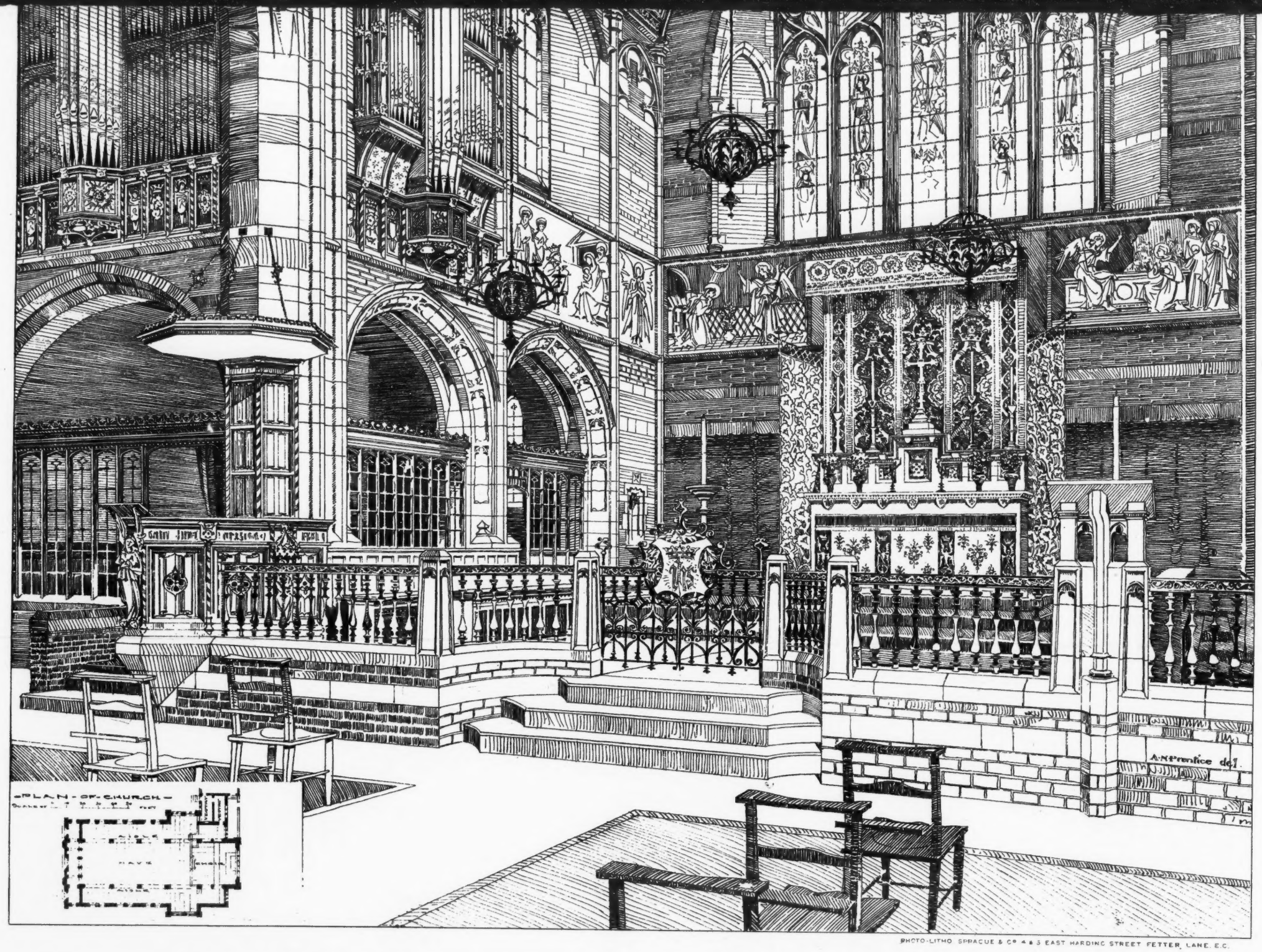
SELECTED DESIGN FOR THE "PARK" INFECTIOUS DISEASES HOSPITA



INK-PHOTO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

US DISEASES HOSPITAL.—Mr. E. T. Hall, F.R.I.B.A., Architect.





NEW CHURCH OF ST. GEORGE, WORCESTER: INTERIOR OF CHANCEL.—Mr. Aston Webb, F.R.I.B.A., Architect.

Royal Academy Exhibition, 1894.